(20,268)

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1906.

No. 304.

HEATH & MILLIGAN MANUFACTURING COMPANY, THE SHERWIN-WILLIAMS COMPANY, ET AL., APPELLANTS,

vs.

J. H. WORST, DIRECTOR OF THE NORTH DAKOTA GOVERNMENT AGRICULTURAL EXPERIMENT STATION.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF NORTH DAKOTA.

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1 In the Circuit Court of the United States for the District of North Dakota.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Pleas before the Honorable Charles F. Amidon, Judge of the District Court of the United States for the District of North Dakota, sitting in the Circuit Court of the United States for said District.

Be It Remembered that on the 2nd day of January, A. D. 1906, a Bill was filed in this cause, which Bill is in words and figures following, to-wit:

2 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, South Eastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Bill.

Henry L. Stern, Solicitor for Complainants.
Sigmund Zeisler, Spalding & Stambaugh, Of Counsel.

Filed Jan. 2, 1906.
J. A. MONTGOMERY, *Clerk.*

3 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, South Eastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Bill.

To the Honorable the Judges of the Circuit Court of the United States for the District of North Dakota:

Your orators hereinafter enumerated exhibit this their bill of complaint against J. H. Worst, director of the North Dakota Gov-

ernment Agricultural Experiment Station, a citizen of the state of North Dakota, and thereupon respectfully complain and show to your Honors as follows:

1. Your orator, Heath and Milligan Manufacturing Company, shows that it is a corporation duly organized under the laws of the State of Illinois; that it is a citizen of the State of Illinois, and has its principal place of business at the City of Chicago, Illinois;
4 that it is lawfully engaged in the business of manufacturing and selling paint; that your orator has been in existence as a corporation since the year 1882, at which time it succeeded to the paint and color manufacturing firm of Heath and Milligan, which firm had been established and had continuously conducted said business since the year 1857; that your orator has continuously, since its organization, sold the products manufactured by it in practically all the states and territories of the United States of America; that it has, by the high quality of its products and by advertising the same in various ways, established an enviable reputation for its goods; that the products of your orator have been sold to users of paint in the State of North Dakota ever since its existence as a state, and even for a number of years while it was under a territorial form of government; that until about four or five years ago your orator sold its products directly to dealers located in the State of North Dakota, soliciting orders from the same through traveling salesmen; that since said time and during about four or five years last past the products of your orator have been sold to dealers in the State of North Dakota through Marshall-Wells Hardware Company, a corporation located at Duluth, Minnesota, which during all said time has acted and continues to act as a distributing agent of your orator's products in the State of North Dakota; that the volume of sales of the products of your orator in the State of North Dakota, made through said distributing agency, for the four years last past, has averaged not less than twenty-five thousand dollars per annum; that not less than sixty (60) per cent. of said volume of business was represented by what is commonly and technically known as mixed paint, manufactured by your orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your orator has been constantly increasing from year to year; that
5 the value of your orator's trade in mixed paints manufactured by it and sold in the State of North Dakota and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state is not less than fifty thousand dollars ($50,000).

2. Your orator, The Sherwin-Williams Company, shows that it is a corporation duly organized under the laws of the State of Ohio; that it is a citizen of the State of Ohio, and has its principal place of business in the City of Cleveland, Ohio; that it is lawfully engaged in the business of manufacturing and selling paint; that in 1866 it succeeded to the business of Sherwin, Williams & Company, and since said time has sold the products manufactured by it in practically all the states and territories of the United States of America, as well as in Canada and Europe; that it has, by the high quality of

its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator have been sold in the State of North Dakota ever since its existence as a state and even for a number of years while it was under a territorial form of government; that during said time it has sold and still sells its products directly to dealers located in the State of North Dakota, soliciting orders for the same through traveling salesmen; that the volume of sales of the products of your said orator in the State of North Dakota made through said salesmen for the four years last past averaged not less than twenty thousand dollars ($20,000) per annum; that not less than sixty per cent. (60%) of said volume of business was represented by what is commonly and technically known as mixed paint manufactured by your orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade
6 in mixed paints manufactured by it and sold in the State of North Dakota, and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state is not less than fifty thousand dollars ($50,000).

3. Your orator, Bradley & Vrooman Company, shows that it is a corporation duly organized under the laws of the State of Illinois; that it is a citizen of the State of Illinois, and has its principal place of business at the City of Chicago, Illinois; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1895, at which time it succeeded to the paint and color manufacturing firm of Bradley & Vrooman, which firm had been established and had continuously conducted said business since the year 1879; that your said orator has continuously since its organization sold the products manufactured by it in many states and territories in the United States of America; that it has by the high qualities of its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for the past six or seven years; that during said period said products have been sold to dealers located in the State of North Dakota through the medium of traveling salesmen and also through Lyman-Eliel Drug Company of Minneapolis, Minnesota, and Jackson Hardware Company, of Aberdeen, South Dakota, as distributing agents of your said orator's products in the State of North Dakota, and that at the present time said products are sold in said state through traveling salesmen, and also through said Jackson Hardware Company, and through Eliel-Jerman Drug Company, the successor of said
7 Lyman-Eliel Drug Company, as distributing agents; that the volume of sales of the products of your said orator in the State of North Dakota made through said traveling salesmen and distributing agencies, during the year 1905, aggregated not less than twenty thousand dollars ($20,000); that not less than seventy-five per cent. (75%) of said volume of business was represented by what is

commonly and technically known as mixed paint manufactured by your said orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota, and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state is not less than fifty thousand dollars ($50,000).

4. Your orator, T. L. Blood & Company, shows that it is a corporation duly organized under the laws of the State of Minnesota; that it is a citizen of the State of Minnesota and has its principal place of business at St. Paul, Minnesota; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1903; that your said orator has continuously, since its organization, sold the products manufactured by it in many of the states and territories of the United States of America; that it has by the high quality of its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for several years last past; that the products of your said orator have
8 been, during said time, sold to dealers located in the State of North Dakota through the medium of traveling salesmen; that the volume of sales of the products of your said orator in the State of North Dakota has been fifty thousand dollars per annum; that a large part of said business was represented by what is commonly and technically known as mixed paint manufactured by your said orator; that the volume of sales of mixed paints manufactured by your said orator and sold in the State of North Dakota has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota, and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state, is not less than one hundred thousand dollars ($100,000).

5. Your orator, Patton Paint Company, shows that it is a corporation duly organized under the laws of the State of Wisconsin; that it is a citizen of the State of Wisconsin and has its principal place of business at the City of Milwaukee, Wisconsin; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1900, at which time it succeeded to the corporation of James E. Patton Company, which had continuously conducted said business since the year 1855; that your said orator has continuously since its organization sold the products manufactured by it in practically all the states and territories of the United States of America; that it has by the high quality of its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator and said predecessor have been sold to

users of paint in the State of North Dakota ever since its ex-
9 istence as a state, and even for a number of years while it was under a territorial form of government; that until about five years ago your orator sold directly to dealers in the State of North Dakota, soliciting orders through traveling salesmen; that since said time, and during the five years last past, the products of your said orator have been sold to dealers in the State of North Dakota through Pittsburgh Plate Glass Company, a corporation located at Minneapolis, Minnesota, which during all of said time has acted and continues to act as a distributing agent of your said orator's products in the State of North Dakota; that the volume of sales of the products of your said orator in the State of North Dakota made through said distributing agency for the four years last past averaged not less than ten thousand dollars ($10,000) per annum; that not less than sixty per cent. of said volume of business was represented by what is commonly and technically known as mixed paint manufactured by your said orator; that the volume of sales of mixed paints manufactured by your said orator and sold in the State of North Dakota has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota and the value of the trade name attaching to the brands of mixed paints manufactured by it and sold in said state is not less than fifty thousand dollars ($50,000).

6. Your orator, John W. Masury & Son, shows that it is a corporation duly organized under the laws of the State of New York; that it is a citizen of the State of New York, and has its principal place of business at the City of New York in the State of New York; that it is lawfully engaged in the business of manufacturing and selling paint, and that it and its predecessors in interest have been continuously engaged in said business since the year 1835; that
10 for many years last past it has sold the products manufactured by it in practically all the states and territories of the United States of America; that it has by the high quality of its products and by advertising the same in various ways, established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for many years; that said products have been sold to dealers in the State of North Dakota largely through Forman, Ford & Company of Minneapolis, Minnesota, as distributing agents; that at this time said Forman, Ford & Company continue to act as distributing agents of your said orator's products in the State of North Dakota; that the volume of sales of the products of your said orator in the State of North Dakota during the past several years has averaged not less than five thousand dollars; that a large part of said volume of business is represented by what is commonly and technically known as mixed paint manufactured by your said orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota and the value of the trade name in the State of North Dakota, attaching to the brands

of mixed paint manufactured by it and sold in said state is not less than twenty-five thousand dollars ($25,000).

7. Your orator, Acme White Lead and Color Works, shows that it is a corporation duly organized under the laws of the State of Michigan; that it is a citizen of the State of Michigan, and has its principal place of business in the City of Detroit, Michigan; that it is lawfully engaged in the business of manufacturing and sell-
11 ing paint; that your said orator has been in existence as a corporation since 1884; that your said orator has continuously since its organization sold the products manufactured by it in practically all the states and territories of the United States of America; that it has by the high quality of its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for the period of at least twelve years last past; that said products have been sold during said time to dealers located in the State of North Dakota through traveling salesmen, and also through various distributing agencies at St. Paul and Minneapolis, Minnesota, and that at the present time said products are sold to dealers in the State of North Dakota through traveling salesmen, and also largely through Hackett, Walther, Gates Hardware Company of St. Paul, which acts as distributing agent in the sale of said products; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator, which sales were made through said traveling salesmen and distributing agencies, has averaged very largely in excess of two thousand dollars ($2,000) per annum for several years last past; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota and the value of the trade name attaching to the brands of mixed paints manufactured by it and sold in said state is not less than fifty thousand dollars ($50,000).

8. Your orator, Detroit White Lead Works, shows that it is a corporation duly organized under the laws of the State of
12 Michigan; that it is a citizen of the State of Michigan and has its principal place of business at the City of Detroit, Michigan; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1880; that your said orator has, since its organization, sold the products manufactured by it in practically all the states and territories of the United States of America; that it has, by the high quality of its products and by advertising the same, in various ways, established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for many years last past; that said products have been sold to dealers located in the State of North Dakota through traveling salesmen and also through distributing agencies; that at the present time said products are sold to dealers in the State of North Dakota through Kennedy, Suffel & Andrews, of Minneap-

olis, Minnesota, as distributing agents; that the volume of sales of the products of your said orator in the State of North Dakota for several years last past, averaged not less than ten thousand dollars ($10,000) per annum; that not less than twenty-five per cent. of said volume of business was represented by what is commonly and technically known as mixed paint manufactured by your said orator; that the volume of said sales of mixed paint in the State of North Dakota manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota, and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state is not less than twenty-five thousand dollars ($25,000.).

13 9. Your orator, Devoe & Raynolds Company, shows that it is a corporation duly organized under the laws of the State of Illinois; that it is a citizen of the State of Illinois and has its principal place of business at Chicago, Illinois; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1898; that your said orator has continuously, since its organization, sold the products manufactured by it in many states and territories of the United States of America; that it has by the high quality of its products and by advertising the same in various ways established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota for several years last past; that said products have been sold to dealers in said state largely through J. B. and C. T. Moffett, of Minneapolis, Minnesota, as distributing agents; that the volume of sales of the products of your said orator in the State of North Dakota for several years last past has averaged not less than five thousand dollars ($5,000) per annum and that more than two thousand dollars ($2,000) per annum of said business was represented by what is commonly and technically known as mixed paint manufactured by your said orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota and the value of the trade name in the State of North Dakota attaching to the brands of mixed paint manufactured by it and sold in said state is not less than ten thousand dollars ($10,000).

14 10. Your orators, William H. Lucas and Albert Lucas, show that they are co-partners doing business under the firm name of John Lucas & Company; that they are citizens of the State of Pennsylvania and have their principal place of business at the City of Philadelphia, Pennsylvania; that they are lawfully engaged in the business of manufacturing and selling paint; that said firm has conducted said business continuously from the year 1852 to the present time; that said firm has continuously since said time sold the products manufactured by it in practically all the states

and territories of the United States of America; that said firm has, by the high quality of its products and by advertising the same in various ways, established an enviable reputation for its goods; that the products of said firm have been sold to users of paint in the State of North Dakota for more than five years last past; that during said time said products have been sold to dealers located in the State of North Dakota through the medium of traveling salesmen and through distributing agencies; that at the present time Brown Drug Company, of Sioux City, Iowa, and Jewitt Drug Company, of Aberdeen, South Dakota, act as distributing agents for the sale of your said orator's products in the State of North Dakota; that the volume of sales of the products of your said orators in the State of North Dakota for several years last past has averaged not less than ten thousand dollars per annum; that a large part of said volume of business was represented by what is commonly and technically known as mixed paint manufactured by your said orators; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orators has been constantly increasing from year to year; that the value of your said orators' trade in mixed paints manufactured by them and sold by them in the State of North Dakota and the value of the trade name in the State of North Dakota attaching to the brands of mixed paint manufactured by
15 them and sold in said state is not less than fifty thousand dollars ($50,000).

11. Your orator, Harrison Bros. & Company, shows that it is a corporation duly organized under the laws of the State of Pennsylvania; that it is a citizen of the State of Pennsylvania and has its principal place of business at the City of Philadelphia, Pennsylvania; that it is lawfully engaged in the business of manufacturing and selling paint; that your said orator has been in existence as a corporation since the year 1898, at which time it succeeded to the paint and color manufacturing business, established and conducted by John Harrison in 1793; that your said orator has continuously since its organization sold the products manufactured by it in practically all the states and territories of the United States of America; that it has, by the high quality of its products and by advertising the same in various ways, established an enviable reputation for its goods; that the products of your said orator have been sold to users of paint in the State of North Dakota ever since its existence as a state, and even for a number of years before that time; that until about five years ago your said orator sold its products directly to dealers located in the State of North Dakota, soliciting orders from the same through traveling salesmen; that since said time and during about five years last past the products of your said orator have been sold to dealers in the State of North Dakota, through Janney, Semple, Hill & Co., located at Minneapolis, Minnesota, which during all said time has acted and continues to act as a distributing agent of your said orator's products in the State of North Dakota; that the volume of sales of the products of your said orator in the State of North Dakota, made through said distributing agency, for the four years last past, averaged not less than $10,000 dollars per
16 annum; that not less than 75 per cent. of said volume of business was represented by what is commonly and technically

known as mixed paint, manufactured by your said orator; that the volume of sales in the State of North Dakota of mixed paints manufactured by your said orator has been constantly increasing from year to year; that the value of your said orator's trade in mixed paints manufactured by it and sold in the State of North Dakota, and the value of the trade name in the State of North Dakota attaching to the brands of mixed paints manufactured by it and sold in said state is not less than thirty-five thousand dollars ($35,000).

12. Your orators further show unto your Honors that at the last session of the legislature of the State of North Dakota there was passed an act, approved March 6, 1905, in force January 1, 1906, in the words and figures following to wit:

"AN ACT to prevent the Adulteration of and Deception in the Sale of White Lead and Mixed Paints.

Be it enacted by the Legislative Assembly of the State of North Dakota:

1. PERSONS MANUFACTURING, SELLING OR OFFERING FOR SALE WHITE LEAD OR PAINTS MUST ADOPT CERTAIN LABEL, SHOWING MINERAL CONSTITUENTS, ADULTERATION CONSTITUTES A MISDEMEANOR. PENALTY. EXCEPTION.) Every person, firm or corporation who manufactures for sale or exposes for sale, or sells, within this state, any white lead, paint or compound intended for use as such, shall label the same in clear and distinct open gothic letters upon a white background and show the true per cent. of each mineral constituent contained in said paint, or if other than linseed oil is used in its preparation, the names of such oils or substitutes shall be
17 shown together with the percentage thereof, and every person, firm or corporation who manufactures for sale, or exposes for sale or sells within this state, any mixed paint or compound intended for use as such which contains any ingredient other than pure linseed oil, pure carbonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors, shall be deemed guilty of a misdemeanor and upon conviction thereof shall, for each offense, be punished by a fine of not less than twenty-five and not more than one hundred dollars and costs, or by imprisonment in the county jail not exceeding sixty days; provided that any such person, firm or corporation, who shall manufacture for sale or expose for sale, or sell within this state any white lead, paint or mixed paint containing ingredients other than those as above enumerated, shall not be deemed guilty of a violation of this act in case the same be properly labeled showing the quantity or amount of each and every ingredient used therein and not specified above, and the name and residence of the manufacturer or person for whom it is manufactured.

2. POSSESSION OF ARTICLES IN VIOLATION OF THIS ACT DEEMED *PRIMA FACIE* EVIDENCE OF VIOLATION.) The having in possession by any person, firm or corporation dealing in said articles, any articles or substances hereinbefore described and not properly labeled, as provided by section 1 of this act, shall

be considered *prima facie* evidence that the same is kept by such person or firm in violation of the provisions of this act and punishable under it.

3. DIRECTOR OF NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION CHARGED WITH ENFORCEMENT OF THIS ACT.) The director of the North Dakota Government Agricultural Experiment Station is charged with the proper
18 enforcement of all the provisions of this act.

4. DIRECTOR, ASSISTANTS, ETC., TO HAVE ACCESS TO ALL PLACES MANUFACTURING OR SELLING ARTICLES NAMED IN THIS ACT, WITH POWER TO OPEN PACKAGES.) The said director and the assistants, experts, chemists and agents shall be duly authorized for the purpose, and shall have access and ingress to all places of business, factories, stores and buildings used for the manufacture or sale of paints. They shall also have power and authority to open any package, can, jar, tub or other receptacle containing white lead paints that may be sold, manufactured or exposed for sale, in violation of the provisions of this act.

5. ACT IN FORCE JANUARY 1st, 1906.) This act shall take effect and be in force from and after January 1, 1906."

13. Your orators further show unto your Honors that said J. H. Worst, who is made a defendant to this bill, is the director of the North Dakota Government Agricultural Experiment Station, and that he has threatened to enforce, and is about, by himself, his assistants, experts and agents, to enforce all the provisions of said act, and to exercise all the power conferred upon him and them by said act.

14. Your orators further show unto your Honors that each of them manufactures and, directly or indirectly, sells in the State of North Dakota mixed paints containing ingredients other than those specified in said act.

15. Your orators further show that the term "mixed paint" has an absolutely defined meaning in the paint manufacturing and selling trade, and means a paint which, before being put up by the manufacturer in cans or other containers, has been so thinned by the manufacturer by the admixture of the proper liquid
19 vehicles as to reduce it to a consistency which makes it ready for use; that said term "mixed paint" is used in contradistinction to what is known as "paste paint;" that the term "paste paint" likewise has an absolutely defined meaning in the paint manufacturing and selling trade, and means a compound in paste form containing the necessary elements to make it a paint ready for use, except that it requires the addition of thinning material to give it the consistency necessary to make it ready for application to the surface intended to be covered.

16. Your orators further show that the term "white lead" is a commercial term and not a scientific term; that by said term is commonly understood a dry powder consisting of commercial carbonate of lead; that such white lead when ground in linseed oil

to a paste consistency is commonly called "white lead in oil" in the paint manufacturing and selling trade, but is colloquially referred to frequently as "white lead;" that the term "white lead paint," as used in the said act and the term "white lead," as used in the title of said act, are used interchangeably and are intended in said act to denote white lead in oil as hereinabove defined; that various compounds containing no carbonate of lead or containing other ingredients in addition to carbonate of lead, are frequently sold in the market labeled as "white lead;" that the words "compound, intended for use as such" following the words "any white lead paint or" in said act, are intended to denote a paste paint intended as a substitute for white lead and labeled or sold as "white lead" or "white lead in oil," but which does not contain any carbonate of lead or contains other ingredients than carbonate of lead in addition thereto.

17. Your orators further show unto your Honors that the manufacture of paint, and more particularly of mixed paint, involves many practical problems, the proper solution of which demands the application of a variety of scientific principles and is the result of a great variety of practical tests and experiments; that the means, methods and processes employed in said manufacture have changed materially in the course of years to conform to the discovery of new scientific facts and the results of practical experiments; that the technology of paint manufacturing has made gradual and constant progress during the last fifty years, during which time it has undergone an evolutionary process which is still far from completed; that until about twenty-five years ago carbonate of lead was the only material which was universally conceded by manufacturers and users of paint to be a proper pigment to be used in paints requiring or admitting of the use of a white pigment; that since said time and within the last twenty-five years, oxide of zinc gradually gained recognition among manufacturers and users of paint as being equally appropriate for the purposes for which theretofore carbonate of lead had alone been recognized as appropriate, and has come to be universally conceded as possessing important useful qualities as a white pigment not possessed by carbonate of lead; that within the last fifteen years practical experiments and tests, made with a view to widening the range of white pigments properly usable in the manufacture of paint, have demonstrated the following facts, which are now conceded by the most advanced and most successful paint manufacturers of the world, viz.:

a. That there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection therewith and in other cases may be used instead thereof, and which, either without carbonate of lead or oxide of zinc, or in connection with one or both of these, according to circumstances, are as efficient as, and in some respects more efficient than, carbonate of lead or oxide of zinc or a combination of the two for the purposes for which the latter are used in paint; that among said materials are (*a*) sublimed lead (which is an artificial product

consisting of sulphate of lead and oxy-sulphate of lead), (*b*) standard zinc lead white (which is commonly called zinc lead and is an artificial product made by the United States Smelting Company and sold in large quantities and consists of a combination of sulphate of lead and oxide of zinc united by a furnace process), (*c*) zinc made from western ores which carries in its natural composition varying proportions of sulphate of lead and oxide of zinc, and (*d*) an artificial opaque white pigment consisting essentially of zinc sulphide, zinc oxide and barium sulphate which is known to the paint manufacturing trade under various trade names such as lithopone, ponolith, lithophone, charlton white, becton white and Orr's white.

b. That there are certain white pigments other than carbonate of lead and oxide of zinc which constitute proper and useful ingredients of paints and which, if so used in connection with carbonate of lead or oxide of zinc or a combination of the same, or in connection with one or more of said other materials described in the last preceding paragraph as proper substitutes for carbonate of lead and oxide of zinc, furnish to the paint wherein used important useful qualities not possessed by either carbonate of lead or oxide of zinc or any of said substitutes therefor; that among said other pigments are sulphate of barium, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, and others; that the proportionate amount of the pigments last named which may properly and usefully be made an ingredient of paint and whether
22 any of them may be properly used as such ingredient depends upon a great variety of conditions and circumstances, but all of said pigments may, under proper conditions, serve a highly useful purpose and where properly used do essentially increase the durability and density of the paint.

18. And your orators, therefore, charge that said act, in condemning inferentially the use of sublimed lead, standard zinc lead white, zinc made from western ores, lithopone, sulphate of barium, silica, silicate of magnesia, calcium carbonate and hydrated sulphate of lime as ingredients of mixed paint and branding them as adulterants, ignores the fact that all said substances constitute proper, useful and necessary ingredients of paint, is based upon antiquated, obsolete and quite generally discarded prejudices regarding the ingredients proper, useful and necessary to be used in paint, and is therefore unreasonable and void.

19. And your orators show that most of the successful paint manufacturers in the United States have for many years maintained and continue to maintain, in connection with their factories, chemical laboratories wherein are employed most accomplished chemical experts who constantly conduct investigations, researches and experiments with a view to discovering improved methods of manufacturing paint, the qualities and properties of new materials which might be usefully employed in the manufacture of paint, the proper combination between various ingredients of paint and the proportionate amount of such ingredients which will produce the best results; and said manufacturers also have for years maintained and continue to maintain, in connection with their respective factories,

stations for the conducting of purely physical tests to determine the covering power, opacity, durability, spreading quality, consistency, density and other physical properties of various kinds of paints manufactured by them, respectively, and by rival manufacturers, as applied to varying conditions both as regards the physical qualities of the surface to be covered and as regards the atmospheric and weather conditions generally to which paint-covered surfaces are exposed, in many of which tests painted surfaces are exposed to atmospheric influences approaching as nearly as possible the conditions existing in various climates and at various seasons; that the business success of the various paint manufacturers largely depends upon the efficiency of said laboratories and experimental stations and their readiness and ability to conform their methods of manufacturing to the truths discovered by said investigations and tests; that said investigations and experiments and the careful consideration by the manufacturers of paint of the actual results attending the use of their products under varying climatic conditions have led to the adoption of constantly improved methods of manufacture, including the use of a widening range of ingredients, as hereinabove shown, and have brought about a constantly increasing degree of efficiency in the paint produced; that the continuance of such investigations, experiments and observations is sure to lead to further discoveries as to ingredients to be used and methods to be employed and is sure to bring about a still higher and gradually increasing degree of merit and efficiency in the paint of the future.

23

20. Your orators further show unto your Honors that whereas the only ingredients usable as a vehicle or thinning material of mixed paint specified in said act are linseed oil and turpentine, there are conditions under which the use of other liquids as thinning material in connection with or in place of one or the other of said thinning ingredients specified in said act is absolutely essential; that there exists a very large demand for mixed paint which on the one hand is capable of producing a high gloss finish for decorative purposes, and on the other hand offers a specially high degree of resistance to the influence of moisture; that such mixed paint is demanded for the following purposes, among others: for painting carriages, buggies and sleighs; for the painting or staining of floors and other woodwork in the interior of buildings; for the staining, painting, decorating and enameling of furniture and household goods like bath tubs, stoves, stove pipe, picture frames, radiators, bicycles, flower pots; for painting the walls and ceilings of kitchens, laundries, bath rooms, hospital ward rooms, and the like; for painting exposed structural iron surfaces of bridges, stairways, fire escapes and the like; that the high gloss finish or imperviousness to moisture demanded for said purposes can not be produced by linseed oil or turpentine or a combination of the two, and that varnish is the only thinning material now known which may appropriately be used as an ingredient of mixed paint to produce said effects.

24

21. And your orators therefore charge that said act, in specifying

only linseed oil and turpentine as ingredients proper to be used as thinning vehicles in mixed paints and in excluding varnish and thereby inferentially branding it as an adulterant, is unreasonable and void.

22. Your orators further show unto your Honors that pure carbonate of lead, which is one of the ingredients of mixed paint specified in said act, is an article which cannot be used for the purpose of manufacturing paint; that the carbonate of lead which is commonly used and has been used from time immemorial in the manufacture of paint, even of the very highest grades, is not pure carbonate of lead, but contains approximately twenty to thirty per cent. of other ingredients; and your orators further show that most of the mixed paints for which there is a demand cannot be produced by using exclusively the ingredients specified in said act other than carbonate of lead. Your orators, therefore, charge that said act in enumerating "pure" carbonate of lead among the specified ingredients of mixed paint and prohibiting, as a crime, the use of the commonly used commercial carbonate of lead without specifying on a label the quantity or amount of each of its ingredients, is unreasonable and void.

23. Your orators further show unto your Honors that the term "pure colors" used in said act in the enumeration of ingredients of mixed paint is intended to refer to the coloring material used as an ingredient of paint for the purpose of producing the varieties of shades desired or demanded by the market; that the manufacturers of paint in the United States obtain the greater part of said coloring material used by them in powdered form from dealers in or manufacturers of the same; that the coloring material in such powdered form is generally known in the trade under the term "dry colors;" that said dry colors are partly natural products extracted from the earth and cleaned and powdered, and partly artificially produced by chemical and mechanical processes; that the term "pure colors" used in said act, as aforesaid, neither has a definite meaning among the manufacturers of such coloring material as aforesaid or among the manufacturers of paint, nor is it capable of an exact or even approximately exact definition; that there is no definite line of demarkation between pure colors and impure colors; that while some dry colors are regarded as "pure" and others as "impure" by individual manufacturers, there is nothing approaching a consensus of opinion on that subject even among the manufacturers of the highest standing, and that no rational classification on the subject has ever been attempted; that a definite standard of what is necessary to constitute a "pure color" either as to shade or as to composition does not exist and for practical reasons cannot exist; that the standard universally applied to dry colors is not purity but efficiency; that, with the exception of a very few dry colors of limited use in mixed paints, even the very highest and most expensive grades of dry colors made by the leading manufacturers of the United States, or imported from abroad, and commonly used by the manufacturers of the highest grades of paint contain large and widely varying percentages of elements which have no coloring properties; that even among such

dry colors last aforesaid sold by different dry color manufacturers or dealers *under the same designation*, there are the widest possible variations in shade, composition and strength; that the statement last made is particularly true of dry colors composed of or produced from natural earthy deposits, like the colors known as umbers, siennas, ochres and oxides of iron, in which the finished product varies and necessarily varies according to the location of such deposits and, from year to year or from season to season, according to the depth at which such deposits at a particular location are worked; that, for instance, the percentage of iron oxide contained in Italian siennas varies from less than forty-six to upwards of sixty-seven, and the percentage of silica therein varies from less than six to upwards of twenty-two; that the percentage of iron oxide in umbers varies from less than twenty-three to upwards of forty-one; that one of the highest types of domestic ochre most largely used by manufacturers in the United States at the present time contains only about fifteen per cent. or iron oxide, while other domestic ochres of less painting value contain as much as forty-six per cent. of iron oxide; that the wide
27 variation in the composition of dry colors hereinabove mentioned has no bearing on the quality of the paint produced by using the same.

24. Your orators further show unto your Honors that the shades of paint known as reds, pinks, browns, buffs, bronze greens, olives, grays, terra cottas and many other tints can only be produced by the use of umbers, siennas, natural oxides of iron or one or more of the following dry colors, all of which contain large percentages of ingredients which have no coloring properties:

(*a.*) Commercial bright-oxide of iron, which is an artificial product produced by burning sulphate of iron with oxide of lime, resulting in a chemical combination consisting of approximately thirty-seven per cent. of oxide of iron, which possesses coloring properties, and approximately sixty-three per cent. of sulphate of lime, which possesses no coloring properties whatsoever.

(*b.*) Yellow ochre, which is a natural earth product, consisting of a clay and silica base colored by hydrated oxide of iron; the percentage of hydrated oxide of iron contained in commercial ochre differs very widely; the highest type of ochre in common use by the paint manufacturers of the United States contains approximately twenty per cent. of hydrated oxide of iron, the remaining ingredients being clay and silica; clay and silica possess in themselves no coloring properties.

(*c.*) Bone black (also called drop black and ivory black), an artificial product produced by burning animal bones, which consists of approximately fifteen per cent. of carbon, the balance being chiefly carbonate of lime and phosphate of lime; carbonate of lime and phosphate of lime in themselves possess no coloring properties.

(*d.*) Graphite, which is a natural product, a typical com-
28 position of which consists of approximately fifty per cent. graphitic carbon, the balance consisting chiefly of silica and silicates, said silica and silicates in themselves possessing no coloring properties.

25. Your orators further show unto your Honors that while vermilion struck upon oxide of lead is by many manufacturers, as a matter of tradition or prejudice, regarded as a pure color, and may be properly used as an ingredient of *paste* paint, it cannot safely be used to produce vermilion *mixed* paint, because if so used the mixed paint in the can is liable to become solidified and unfit for use; vermilion struck upon sulphate of barium (which is a natural product) or upon blanc fixe (which is an artificially produced sulphate of barium) would not commonly be regarded as a pure color, but is used to produce the same shades as vermilion struck upon oxide of lead; mixed paint containing vermilion struck upon natural or artificial sulphate of barium does not become solidified in the can and is a better paint, of greater brilliancy and vastly increased durability of color than any paint which can be produced by using as an ingredient vermilion struck upon oxide of lead.

26. Your orators, therefore, charge that said act, in specifying "pure colors" among the ingredients of mixed paint and making the use of any but "pure colors" as such ingredient a crime, unless the manufacturer or dealer stigmatizes the paint by a label as required in said act, is so uncertain and unreasonable as to be void.

27. Your orators further show unto your Honors that the only purposes for which paint is used are to preserve and beautify; that is to say, to protect the painted material from the destructive effect of exposure to atmospheric conditions and the action of the elements, and to make the surface more pleasing to the eye; that that
29 paint is the most efficient which accomplishes these purposes in the highest degree for the longest time; that any ingredient which tends to enhance the efficiency of paint or give it a useful quality is a proper ingredient; that there is no natural standard of purity of paint, nor is there a generally or even widely accepted standard of purity of paint; that any enumeration of allowable ingredients of paints short of an exhaustive enumeration of all ingredients which may under particular circumstances or conditions give to paint a useful quality, is necessarily unjust and unreasonable; that even such an exhaustive enumeration in the light of the knowledge of the technology of paint manufacturing of to-day is liable to become unjust and unreasonable by to-morrow's discoveries; that the use of none but useful ingredients in the manufacture of paint is not in itself sufficient by any means to insure efficient paint; that in order to insure efficiency not only must proper and useful ingredients be combined in proper proportions widely varying according to the material to be covered, the shades to be produced, the climatic conditions to which it is to be exposed and many other conditions and circumstances, but such ingredients must also be subjected in the manufacture to the proper mechanical processes required to produce the complete blending of the combined ingredients both solid and liquid, which in turn is indispensable to insure durability, opacity, covering property, consistency and proper spreading quality of the paint, its proper action under the brush, and many other important qualities; and your orators therefore charge that for the reasons aforesaid it is impossible logically to speak of a standard of purity as ap-

plied to paint, nor is it reasonable for any statute to attempt to set up a standard of efficiency of paint by an enumeration of allow-
30 able ingredients, the only test of the efficiency of paint being its ability to serve the purposes for which it is intended.

28. Your orators show unto your Honors, and charge the fact to be that the said act by specifying linseed oil, pure carbonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors as proper ingredients of mixed paint and making it a crime to manufacture, sell or expose for sale within the State of North Dakota any mixed paint containing any ingredients other than those therein specified as aforesaid, unless such paint be properly labelled, showing the quantity or amount of each and every ingredient used therein other than those specified in said act, is intended and calculated to create in the minds of the mixed paint dealers and consumers in the State of North Dakota the erroneous belief that all ingredients of mixed paint other than those specified in said act are adulterants used for the purpose of cheapening the product and add no quality of usefulness or efficiency to the mixed paint wherein they are used; that said act in requiring mixed paint containing any ingredients other than those specified in said act as aforesaid, to be labelled as aforesaid, is a requirement that the manufacturer of and dealer in such paint shall brand the same in such a way as to hold it up to the suspicion and prejudice of the users of mixed paint, and thereby make the sale thereof in said state, if not impossible, at least more difficult and expensive.

29. Your orators further show unto your Honors that the presence of sublimed lead, standard zinc lead white, zinc made from western ores, lithopone, sulphate of baritum, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, varnish, or any two or more or all of them in mixed paint has no tendency whatsoever to render the mixed paint wherein they are or any of them is
31 used or the application of such mixed paint for any of the purposes for which paint is properly used, or the handling of such mixed paint by those applying the same, harmful to health in any sense or degree.

30. Your orators further show unto your Honors that while said act was intended to be a police regulation for the prevention of fraud, its provisions are such that it has no tendency to accomplish such end; that said act, by failing to specify the maximum or minimum of the proportionate amount of the ingredients specified in said act which are to be or may be used in mixed paint, permits of the manufacture and sale, without any label whatsoever, of mixed paint containing said ingredients in such proportions as to make it absolutely inefficient and useless and a fraud upon the purchaser; that by holding up to the prejudice of dealers in and users of mixed paint, such mixed paints as contain ingredients other than those specified in said act, said act renders unsalable or less salable a large number of brands of mixed paints containing ingredients other than those specified in said act, which mixed paints are far more efficient for certain purposes than any mixed paints can be made by using only the ingredients specified in said act; that said act, therefore, has the direct

tendency in many instances to encourage the people of the State of North Dakota to give to inferior brands of mixed paint a preference over superior brands of mixed paint in the mistaken belief engendered by said act that the poorer article is better than the better article.

31. Your orators further show unto your Honors that said act further fails in its object to accomplish the prevention of fraud in that it enumerates "Japan dryer" among the sanctioned ingredients of mixed paint, because the term "Japan dryer" as commonly used and understood in the paint trade is broad enough to include
32 innumerable varieties of liquids which are capable of promoting oxidation or drying of the paint, among them liquids of such nature as to either materially impair or to utterly destroy the life and usefulness of the paint.

32. Your orators further show unto your Honors that said act has no tendency to accomplish the prevention of fraud for the further reason that nothing contained in said act prevents the manufacturing, selling or exposing for sale of any imaginable paint concoction in *paste* form nor the manufacturing, selling or exposing for sale any kind of impure coloring material, nor the manufacturing, selling or exposing for sale of impure linseed oil or of any substitute for linseed oil, nor the manufacturing, selling or exposing for sale as "white lead" or as "white lead in oil" or as "white lead paint" of any spurious article substituted therefor, and because a paint ready for use may be lawfully made by the mixing together of such concoctions and substitutes or spurious substances and because nothing contained in said act prevents a painter from making a paint ready for use by mixing of such concoctions and substitutes and using the same in jobs of painting.

33. Your orators further show unto your Honors that the manufacture and sale of paste paint is a substantial part of the paint manufacturing and selling business of the United States; that millions of dollars worth of white lead in oil and compounds intended as substitutes therefor, are annually manufactured and sold in the United States; that tinting colors for use as an ingredient of paint are manufactured in large quantities and sold in cans, in paste form, throughout the United States; that linseed oil, as such, is an article of commerce throughout the United States; that said act, by
33 failing to impose any restriction upon the manufacturer and seller of white lead in oil, or on the manufacturer or seller of paste paint of every kind or shade, or on the manufacturer or seller of tinting colors or of linseed oil, or on the manufacturer or seller of any compound or substance intended as substitutes for any of said products, but imposing the penalties and restrictions provided for in said act, exclusively upon the manufacturer and seller of *mixed* paint, unreasonably and unjustly discriminates against your orators as manufacturers and sellers of mixed paint, and denies to your orators as manufacturers and sellers of mixed paint the equal protection of the laws, contrary to the provisions of the Fourteenth Amendment to the Constitution of the United States, and for the same reason, as well as by reason of the other facts and circumstances hereinabove

set forth the enforcement of said act will deprive your orators as manufacturers and sellers of mixed paint of their property without due process of law, contrary to the provisions of the said Fourteenth Amendment to the Constitution of the United States.

34. Your orators further show unto your Honors that each of your orators manufactures scores of different kinds and shades of mixed paint differing from each other in chemical composition; that even the same kind and shade of mixed paint manufactured by any one of your orators has no fixed chemical composition, but varies in such composition from time to time and practically with each lot manufactured, by reason of the wide variations in the chemical composition of the constituent ingredients, more especially the chemical composition of the dry colors used; that in order to properly label the cans of mixed paint manufactured by your orators and sold in North Dakota showing "the quantity or amount of each and
34 every ingredient used therein, and not specified" in said act, each of your orators would have to have a chemical analysis made of each lot of mixed paint before putting the same up in cans or other containers; that the expense of making such analyses and printing labels showing the same, and affixing such labels to the cans or other containers would add materially to the cost of manufacture, and would impose an unjust and unreasonable burden upon the manufacturer of *mixed* paints containing other ingredients than those specified in said act, whereas the manufacturer of *paste* paint as well as the manufacturer of mixed paint containing only ingredients specified in said act would be free from such burden; that the imposition of said burden upon your orators as manufacturers of mixed paint containing other ingredients than those specified in said act deprives them of property without due process of law, and denies to them the equal protection of the laws, contrary to the provisions of the Fourteenth Amendment to the Constitution of the United States.

35. And your orators show unto your Honors that there are hundreds of dealers in the State of North Dakota who have on hand stocks of mixed paint manufactured by one or another of your orators and bought directly or indirectly from your orators, which contain ingredients in addition to or other than those specified in said act but are not labeled as required by said act and cannot be so labeled by said dealers, respectively, without the cans containing said mixed paint being opened and subjected to chemical analysis, which opening would make the packages of paint unsalable and which analysis would cost a considerable sum of money in the case of each can thus opened and analyzed; that unless the en-
35 forcement of said act be enjoined and said act be decreed to be void, every one of said dealers having on hand such stock of mixed paint as aforesaid, unless the same be opened, analyzed and labelled as aforesaid, will be subject to criminal prosecution and all said stocks, unless so labeled as aforesaid, will be unsalable as contravening the requirements of said act; that the dealers in mixed paint in said state who will in the future purchase such mixed paints manufactured by your orators or any of them and not labeled as re-

quired in said act as well as the distributing agents and salesmen of your orators selling such mixed paint in the future in the State of North Dakota, will be subject to criminal prosecution; that thereby a multiplicity of criminal prosecutions will ensue, the proper determination of all of which would involve the construction and the question of the validity of said act; that for fear of such prosecutions many of said dealers will refuse to buy such mixed paints manufactured by your orators and not conforming to the specifications of said act, unless labeled as required by said act, whereby incalculable and irreparable damage will be caused to your orators; that practically all the mixed paint manufactured by your orators, respectively, and sold to dealers in the State of North Dakota, is as a matter of established custom, sold to said dealers on credit; that many of said dealers who will in the future purchase such mixed paints manufactured by your orators, respectively, and not labeled as aforesaid, will refuse to pay for the same to your orators, respectively, or to their respective distributing agents on the ground that said paints were sold contrary to the provisions of said act, and are unsalable by them in said state under the provisions of said act, whereby
36 your orators and their respective distributing agents will be compelled to resort to a multiplicity of civil suits to enforce such payments, all of which suits would involve the construction and the question of the validity of said act; and if your orators should label the mixed paints manufactured by them respectively as required by said act, your orators would not only be subjected to the loss and expense of analyzing and labeling their products, respectively, as hereinabove shown, but said products will be held up to the suspicion and prejudice of the dealers in and users of mixed paint in said state, which suspicion and prejudice will make it either impossible or at least more difficult and expensive for your orators, to sell their said products in said state, all of which would produce incalculable and irreparable injury to your orators; that few, if any, dealers in mixed paint in said state who by reason of their respective stocks of mixed paint on hand are now subject, or who may in the future become subject, to criminal prosecution under said act will have a sufficient interest or be able to successfully raise the defense of the invalidity of said act, inasmuch as such defense involves the consideration of the complex state of facts hereinabove set forth. Wherefore your orators have reason to fear and do fear that many or most of said prosecutions will result in convictions, and that by such convictions the various brands of mixed paints involved therein, respectively, will be branded in the State of North Dakota as adulterated and illegal products, and will thereby be rendered unsalable, all of which will produce incalculable and irreparable injury to your orators, and will constitute the taking of your orators' property without due process of law and the denial to them of the equal protection of the laws.

36. To the end, therefore, that the said J. H. Worst, as
37 director of the North Dakota Government Agricultural Experiment Station, who is hereby made a party defendant to this your orator's bill of complaint, may be required to make answer

thereto, but not under oath (the answer under oath being hereby expressly waived), and that upon the filing of this bill the said defendant, as director of the North Dakota Government Agricultural Experiment Station, his successor or successors in said office, and his attorneys, assistants, substitutes, agents and subordinates be restrained by a preliminary injunction from in any wise enforcing or attempting to enforce the provisions of an act of the legislature of the State of North Dakota, entitled "An Act to prevent the adulteration of and deception in the sale of white lead and mixed paints," approved March 6, 1905, in force January 1, 1906, and from doing any act authoried by said statute and not otherwise permitted by law, and from instituting, authorizing, causing, directing or prosecuting any suit, action or prosecution for any violation of the provisions of said act; that upon the final hearing of this cause said act may be declared and decreed to be unconstitutional and void, and said injunction may be made perpetual; and that your orators may have such other, further and different relief as may be agreeable to equity and good conscience and as to your Honors may seem meet.

37. May it please your Honors to grant unto your orators the writ of subpœna requiring the defendant, J. H. Worst, director of the North Dakota Government Agricultural Experiment Station, to be and appear before this Honorable court on the next rule day thereof, then and there to answer this bill; and may it also please your Honors to grant unto your orators the people's writ of injunction directed to the said J. H. Worst, his successor and
38 successors in office, and his attorneys, assistants, substitutes, agents and subordinates, enjoining and restraining them in the manner aforesaid.

And your orators will ever pray.

HEATH & MILLIGAN MANUFACTURING COMPANY,
THE SHERWIN-WILLIAMS COMPANY,
BRADLEY & VROOMAN COMPANY,
T. L. BLOOD & COMPANY,
PATTON PAINT COMPANY,
JOHN W. MASURY & SON,
ACME WHITE LEAD & COLOR WORKS,
DETROIT WHITE LEAD WORKS,
DEVOE & RAYNOLDS COMPANY,
WILLIAM H. LUCAS,
ALBERT LUCAS, AND
HARRISON BROTHERS & COMPANY,
By HENRY L. STERN, *Their Solicitor.*

SIGMUND ZEISLER,
SPALDING & STAMBAUGH,
Of Counsel.

39 STATE OF ILLINOIS, *County of Cook, ss:*

Ernest W. Heath, being duly sworn, on oath says that he is president of Heath & Milligan Manufacturing Company, a corporation,

one of the complainants named in the foregoing bill of complaint; that he has read said bill and knows the contents thereof, and that the statements therein contained are true of his own knowledge, except the statements contained in paragraphs two to eleven, inclusive, of said bill, and as to said paragraphs he believes the statements therein contained to be true.

ERNEST W. HEATH.

Subscribed and sworn to before me this 30th day of December, A. D. 1905; and I do hereby certify that I am by the laws of the State of Illinois authorized to administer oaths.

[SEAL.] MAURICE J. MADSEN,
Notary Public, Cook County, Illinois.

40 Thereupon afterwards, to-wit: on the 2nd day of January, A. D. 1906, Order for Subpœna was entered in this cause, which appears of record on page 238 of the Common Rule Book of this Court, in words and figures following, to-wit:—

Case No. 500.

"HEATH AND MILLIGAN *Company* MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The Complainant having filed a bill of complaint herein, on motion of Spalding and Stambaugh, Resident Solicitors, it is ordered that a subpœna issue as therein prayed for."

Thereupon afterwards, to-wit: On the 2nd day of January, A. D. 1906, Subpœna was issued in this cause, which subpœna and return is in words and figures following, to-wit:

"UNITED STATES OF AMERICA, *District of North Dakota, ss:*

The President of the United States of America to J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, Greeting:

We command you, and each of you, that you appear before the Judges of the Circuit Court of the United States for the District of North Dakota, at Fargo, on the first Monday in February next, it being the 5th day of February, 1906, to answer to the bill of complaint of Heath and Milligan Manufacturing Company *et al.*, this day filed in the office of the Clerk of said Court, and then and there to receive and abide by such order and decree as shall then or thereafter be made, upon pain of the said bill being taken as confessed against you and decree pronounced accordingly.

41 Witness the Hon. Melville W. Fuller, Chief Justice of the Supreme Court of the United States, at Fargo, this 2nd day of January, A. D. 1906, and of the Independence the 129th year.

[SEAL.] J. A. MONTGOMERY, *Clerk,*
By E. V. EGGERT, *Deputy.*

Memorandum.

The above named defendant is notified that unless he enters his appearance in the Clerk's office of said Court, at Fargo, aforesaid, on or before the day to which the above writ is returnable, as above stated, the complaint will be taken against him as confessed, and a decree entered thereon accordingly.

J. A. MONTGOMERY, *Clerk,*
By E. V. EGGERT, *Deputy.*"

Upon the back of said Subpœna appear endorsements in words and figures following, to-wit:

"Marshal's Docket # 376. No. 500. Docket A. United States Circuit Court, District of North Dakota. In Chancery. Heath and Milligan Manufacturing Company, *et al., vs.* J. H. Worst, Director of the North Dakota Agricultural Experiment Station. Subpœna in Chancery. Original. Returnable first Monday in February, 1906. J. A. Montgomery, Clerk, By E. V. Eggert, Deputy. Filed Jan. 2, 1906, J. A. Montgomery, Clerk.

Return on Service of Writ.

UNITED STATES OF AMERICA, *District of North Dakota, ss:*

I hereby certify and return that I served the annexed Subpœna in Chancery on the therein named J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, by handing to and leaving a true and correct copy thereof with his wife 42 (at his usual place of abode) personally at Fargo, North Dakota, in said District on the Second day of January, A. D. 1906.

JAMES F. SHEA,
U. S. Marshal,
By A. S. QUIST, *Deputy.*"

Thereupon afterwards, to-wit: on the 2nd day of January, A. D. 1906, restraining order was issued in this cause, which Restraining Order and proof of service thereon is in words and figures following, to-wit:—

"In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Whereas, in the above entitled cause it has been made to appear upon the duly verified bill of the complainants filed herein that a Writ of Injunction to the final hearing is proper, and that *prima*

facie the complainants are entitled thereto, enjoining the defendant, J. H. Worst, as Director of the North Dakota Government Agricultural Experiment Station, his successor or successors in said office, and his attorneys, assistants, substitutes, agents and subordinates from the acts complained of and threatened to be committed,

Now, on motion of said complainants, it is ordered, that the defendant appear before the Circuit Court of the United States
43 for the District of North Dakota in the Eighth Circuit, at the Courtroom of said Court, at the city of Fargo, in the County of Cass and State of North Dakota, upon the 5th day of January, 1906, at ten o'clock in the forenoon of said day, and then and there show cause, if any we have, why the preliminary Injunction prayed for should not issue.

And it appearing to the undersigned, that there is danger of irreparable injury being caused to the complainants before the hearing of said application for preliminary Writ of Injunction can be heard unless said defendant is, pending said hearing, restrained as hereinafter set forth,

Therefore, complainants' application for such restraining order is granted, and it is ordered, that you, the said J. H. Worst, as Director of the North Dakota Government Agricultural Experiment Station, your successor or successors in said office, and you and their attorneys, *assitsntas,* substitutes, agents and subordinates, and all persons acting by or under your authority or direction, be and you are hereby specially restrained and enjoined from in any way enforcing or attempting to enforce the provisions of an act of the Legislature of the State of North Dakota, entitled, "An Act to Prevent the Adulteration of and Deception in the sale of White Lead and Mixed paints," approved March 6th, 1905, and in force January 1st, 1906, and from doing any act authorized by said statute and not otherwise permitted by law, and from instituting, authorizing, causing, directing or prosecuting any suit, action or prosecution from any violation of the provisions of said acts until the further order of this Court.

And it is further ordered, that a copy of this order, certified under the hand of the Clerk and seal of this Court, be served upon the defendant, J. H. Worst, to be restrained thereby.

Dated at Fargo, in the District of North Dakota, this 2nd day of January, 1906.

CHARLES F. AMIDON, *Judge.*

H. L. STERN,
Solicitor for Complainants.
SIGMUND ZEISLER,
SPALDING & STAMBAUGH,
Of Counsel for Complainants, Fargo, North Dakota."

44 Upon the back of said Restraining Order appear endorsements in words and figures following, to-wit:—

"Marshal's Docket No. 375. Original. United States Circuit Court. District of North Dakota. Southeastern Division. Heath and Milligan Manufacturing Company, *et al.,* against, J. H. Worst, Director of the North Dakota Government Agricultural Experiment

Station. Order. H. L. Stern, Solicitor for Complai-ants, Sigmund Zeisler and Spalding and Stambaugh, of Counsel for Complainants, Fargo, North Dakota. Filed Jan. 2, 1906, J. A. Montgomery Clerk.

Return on Service of Writ.

UNITED STATES OF AMERICA, *District of North Dakota, ss:*

I hereby certify and return that I served the annexed Restraining Order on the therein-named J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, by handing to and leaving a true and correct copy thereof with his wife (at his usual place of abode), at Fargo, North Dakota, in said District, on the Second day of January, A. D. 1906.

JAMES F. SHEA,
U. S. Marshal,
By A. S. QUIST, *Deputy.*

Return on Service of Writ.

UNITED STATES OF AMERICA, *District of North Dakota, ss:*

I hereby certify and return that I served the annexed Restraining Order on the therein-named Prof. E. F. Ladd, by handing to and leaving a true and correct copy thereof with him at Fargo, North Dakota, in said Distrtrict, on the Second day of January, A. D. 1906.

JAMES F. SHEA,
U. S. Marshal,
By A. S. QUIST, *Deputy.*"

45 Thereupon afterwards, to-wit: on the 5th day of January, A. D. 1906, Notice of Appearance was filed in this cause, which Notice of Appearance is in words and figures following, to-wit:—

"In the Circuit Court of the United States, District of North Dakota, Eighth Circuit, Southeastern Division. In Chancery.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.,
Complainants,
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station, Defendant.

To the Clerk of said Court:

You will please enter our appearance as solicitors for the defendant in the above entitled suit.

Dated January 4th, 1906.

C. N. FRICK,
Attorney-General North Dakota.
R. N. STEVENS,
Assistant Attorney-General North Dakota.
BALL, WATSON & MACLAY,
Solicitors for the Defendant, Fargo, North Dakota."

Upon the back of said Notice of Appearance appear endorsements in words and figures following, to-wit:—

"U. S. Circuit Court, North Dakota. Heath and Milligan Mfg. Co., *et al.*, against J. H. Worst, etc. Notice of Appearance Def'ts Solicitors. C. N. Frich, R. N. Stevens, Ball, Watson and Maclay, Sols. for Def't. Filed, Jan. 5, 1906, J. A. Montgomery, Clerk."

46 Thereupon afterwards, to-wit: on the 5th day of January, A. D. 1906, Affidavit was filed in this cause, which Affidavit is in words and figures following, to-wit:—

"In Circuit Court of the United States, District of North Dakota, Eighth Circuit, Southeastern Division. In Chancery.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.,
Complainants,
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station, Defendant.

STATE OF NORTH DAKOTA, *County of Cass, ss:*

E. F. Ladd being duly sworn, on his oath deposes and says, that he is now, and has been during fifteen years last past the chemist at the Government Agricultural Experiment Station connected with the North Dakota Agricultural College of the State of North Dakota, and that as such chemist he has had charge of all experiments, investigations and chemical analysis made and had by the che-ical department of said station during said period. That about the time of the passage of the act referred to in the bill of complaint herein, and since the passage of said act, deponent has been engaged in his capacity as such chemist in examining and analyzing white leads, mixed paints and compounds manufactured and offered for sale within the state of North Dakota by the complainants as well as by other manufacturers and sellers of such commodities, for the purpose of determining the quantity and quality of the ingredients contained in such commodities, and their general character as to value and purity; that deponent was, about the time of the passage of said law, and very soon thereafter, in communication with some of the complainants, or their agents, including the Heath & Milligan Manufacturing Company, the Dherwin-Williams Company,
47 John Masury & Son, and others, regarding said law, its purpose and meaning, and that many, if not all, of said complainants had full and complete knowledge of the passage of said law within a very short time after its passage; that on or about the first day of July, 1905, the deponent mailed, or caused to be mailed, to each of said complainants, a printed bulletin issued by said Experiment Station, in which was set forth the whole contents of said law, and by which said complainants were informed that said law had been exacted, and would take effect and be in force from and after the first day of January, 1906; that a copy of said bulletin,

marked Exhibit "A" is hereto attached and made a part of this affidavit.

Deponent further says that from his investigations heretofore made, and from his knowledge derived from a variety of sources, upwards of seventy-five per centum of all of the paints used in this state are such as are commonly known as mixed paints, and are brought into this state in form ready for use; and that the use of paint in these forms, prepared by the manufacturer and made ready for use, has greatly increased within the past few years, and, as above stated, paint in such form, now constitutes the bulk of that commodity which is imported into and used in the State of North Dakota.

Deponent further says that formerly and until the use of mixed paints became general, and largely superseded former methods, the ingredients commonly used in the preparation of white lead paint, or paint, were well known, and the use of adulterants or substitutes for the standard ingredients commonly employed was infrequent and uncommon; that in the evolution of said business, and the coming into use of mixed paints, there was presented the opportunity for employing many substitutes and adulterants; that many of the substances thus employed as substitution and adulterants for the materials in lieu whereof they are used, are very much cheaper in price, poorer in quality and less effectively serve the purposes for which paint is used; and that many mixed paints containing such adulterants and substitutes are almost worthless for use in the protection of property when used as a covering thereof; that
48 some of such substitutes and adulterants used are barytesm whiting, and cliff stone among the pigments, and water, alkali and benzine among the liquids; that a considerable portion of the mixed paints which are now on sale in this state contain the ingredients last above mentioned, or some of them, in various percentages; and that the use of the materials for which such substituted ingredients are used, would have materially augmented the cost of such mixed paints on sale in this state, including those manufactured and prepared by complainants, — *is* put up and placed upon the market in sealed tin cans and containers which are not intended to be opened, and as a rule are not opened, until intended to be used. That prior to the passage of the law mentioned in the bill, there was no legislative requirement that the ingredients of mixed paints be described in the label upon the package, and that there is no way by which the purchaser or used of such paints has been or is able to ascertain or tell the ingredients composing the same, except by employing a chemist to test and analyse the same, and that as a result thereof the mixed paints placed upon the market by paint manufacturers, and which have been very generally adulterated, and in the making of which cheap and inexpensive substitutes have been used, have been commonly sold and used by the people of this state in ignorance of the fact that they were adulterated, and without knowledge on their part that many cheap and inexpensive adulterants and substitutes were employed in their manufacture; that the mixed paints thus adulterated and in the manufacture whereof cheap and inexpensive substitutes have been employed, have

been and are commonly sold in this state under the designation of pure mixed paints, and at or about the same price as that obtained for mixed paints not so adulterated; that some manufacturers of mixed paints have not employed substitutes and adulterants, in the manufacture of their products, and have produced and placed upon the market mixed paints conforming substantially to the requirements of Section 1 of the act of the Legislature mentioned in the bill; that complainant-, T. L. Blood & Co., and certain other manufacturers who are not parties to this suit, among others Senour
49 Manufacturing Company of Chicago, Illinois, and Patterson, Sargent Company, of Cleveland, Ohio, have manufactured and placed upon the market in this state mixed paints which substantially conform to the provisions of the act in the bill mentioned. That a portion of the results of deponent's labors in examining, testing and analysing mixed paints, and white lead paints, now offered for sale upon the market in this state, is embodied in printed bulletin Exhibit "B," which is attached to and made a part of this affidavit.

Deponent further says that he is familiar with the terms and phras-ology commonly used and employed in trade journals and in the trade generally in the matter of the designation of the *a*quality of the ingredients used in the manufacture and production of mixed paints, and that as applied to such materials, the term "pure" in industries, means a product from which the foreign ingredients have been largely removed, but which has not been made chemically pure; for instance, venetian red is a produce resulting from a mixture of lime and iron sulphate when heated, and which product contains about equal proportions of calcium sulphate and ocide of iron, and yet is a commercially pure product, while the only portion of it which constitutes coloring matter is the oxide of iron. That the commercial constituents entering into the manufacture of mixed paints and white lead paints, contain foreign ingredients in small quantities, as, for instance, sulphates in zinc and white lead, and yet these products are recognized as commercially pure.

In the trade the term Japan Dryer refers to a product made by *the* dissolving certain varnishes to which have been added lead or lead and manganese as drying agents, and varies in composition; but the substitution of other constituents may result in producing a product which is not properly recognized in the trade as a Japan Dryer, and has not the value of a Japan Dryer when used in a paint; that while the Japan Dryer known to the paint trade, may contain any of a circumscribed number of liquids, yet none of such recognized liquids when so used, contain deleterious substances or are detri-
50 mental to the quality of the paint, while substitutes which are sometimes used in place of these recognized constituents, injure the quality of the paint.

E. F. LADD.

Subscribed and sworn to before me this 5th day of January, 1906.

MATHEA NYMON,

[SEAL.] *Notary Public, Cass County, North Dakota.*

My Commission Expires November 1st, 1909."

Upon the back of said affidavit appear endorsements in words and figures following, to-wit:

"Original. U. S. Circuit Court, No. Dak. Heath & Milligan Mfg. Co. against J. H. Worst, etc. Affidavit. C. N. Frich, R. N. Stevens, Ball, Watson & Maclay, Sol's for Def't. Rooms 12, 12A, 13 and 14, Stern Building, Fargo, North Dakota." Filed, Jan. 5, 1906, J. A. Montgomery, Clerk."

51 EXHIBIT A.

Filed Jan. 5, 1906. J. A. Montgomery, Clerk.

Government Agricultural Experiment Station, Agricultural College, N. D.

Special Bulletin No. 3.

April, 1905.

1. Pure Food Law—Amended and Re-enacted.
2. Pure Drug Law.
3. Formaldehyde Law.
4. Paris Green Law.
5. Paint Law.
6. Rulings and Discussions.

By E. F. Ladd, Chemist and Commissioner.

The Ninth Legislative Assembly amended and re-enacted the pure food law, and the same session of the legislature passed several other bills as enumerated above. The essential features of each are presented in the following pages together with some rulings and interpretations for the guidance of interested parties.

The Pure Food Law as it now stands is as follows:—

Senate Bill No. 27.

Introduced by Mr. Hanna.

Be it Enacted by the Legislative Assembly of the State of North Dakota:

SECTION 1. Adulterating and Misbranding Foods and Beverages. It shall be unlawful for any person, either for himself, or
52 while acting as agent or servant of any other person or corporation, to manufacture for sale, sell, offer or to have for sale, to solicit orders for, to store or to deliver within the state any article of food or beverage which is unwholesome or adulterated within the meaning of this act. The having in possession of such adulterated article or articles, shall be deemed as *prima facie* evidence of the violation thereof. For the purpose of this act all condiments,

extracts, vinegars, or other substances used in the preparation or compounding of foods or food products and beverages shall be deemed as articles of food.

SECTION 2. What Constitutes Adulteration.) Any article of food or beverage shall be considered as unwholesome or adulterated within the meaning of this act:

First. If it contains any form of aniline dye or other coal tar dye, or if colored with a harmless vegetable dye and the name thereof is not given on the label.

Second. If it contains formaldehyde, benzoic acid, sulphurous acid, boric acid, salicylic acid, hydrofluoric acid, saccharin, beta-naphthol or any salt or antiseptic compound derived from these products.

Third. If any substance or substances have been mixed with it so as to reduce or lower or injuriously affect its quality or strength or food value so that such article of food or beverage when offered for sale, shall deceive or tend to deceive the purchaser.

Fourth. If any inferior or cheaper substance or substances have been substituted wholly or in part for the article, so that the product when sold shall deceive or tend to deceive the purchaser.

Fifth. If any necessary or valuable constituent of the article has been in whole or in part abstracted.

Sixth. If it be an imitation of or offered for sale under the specific name of another article.

Seventh. If it be labeled, branded, or colored so as to deceive or mislead the purchaser, or if it be falsely labeled in any respect.

Eighth. If it consists wholly or in part of a diseased, decomposed, filthy or putrid animal or vegetable substance, or if such substance or substances be used in the preparation thereof.

53 Ninth. If every package, bottle or container does not bear the true net weight, the name of the real manufacturers or jobbers, and the true grade or class of the product, the same to be expressed in clear and distinct English words in black type on a white back ground.

Provided, That an article of food or beverage shall not be deemed adulterated in the following cases:

First. If it be a compound or mixture of recognized food products not included in definitions sixth and eighth of this section.

Second. In the case of candies and chocolates if they contain no terra alba, barytes, tale, chrome yellow or other mineral substances, or aniline dyes or other coal tar dyes or other poisonous colors, flavors or products detrimental to health.

Third. If in the case of baking powders or any mixture or compound intended for use as a baking powder they have affixed to each and every box, can or package containing such powder or like mixture or compound, a light colored label upon the outside and on the face of this there is distinctly printed with black ink and in clear legible type the name and address of the manufacturers, the true and correct anaylsis, and in a form to be prescribed by the North Dakota Government Agricultural Experiment Station, of each and all the constituents or ingredients contained in or contributing a part of such

baking powders, or mixture or compound intended for use as a baking powder. The label shall bear no advertising or descriptive matters other than the name of the manufacturer, composition as prescribed for above, and directions for use.

Fourth. In the case of perishable goods put up in bulk, sodium benzoate may be used in proportion not to exceed one part in two thousand in such products and under such regulations as may be determined upon and proclaimed by the North Dakota Government Agricultural Experiment Station at Fargo. This clause shall not be applicable for goods coming into the state after July, 1907, nor to any case at any time where products can be commercially produced without the use of chemical preservatives. Where the use of preservatives are permitted the fact shall be clearly set forth on this label in the form and manner to be prescribed by the North Dakota Government Agricultural Experiment Station at Fargo.

SECTION 3. Penalty for So Doing.) Any person violating any of the provisions of this act shall be deemed guilty of a mis-
54 demeanor and shall for the first offense be punished by a fine of not less than twenty-five dollars or more than one hundred dollars, and all necessary costs, including the expense of analyzing such adulterated articles when said person has been found guilty under this act.

Products found to be adulterated within the meaning of this act may by order of the court be seized and ordered destroyed.

SECTION 4. Duty of State's Attorney. It shall be the duty of the state's attorney to prosecute all persons violating any of the provisions of this act when the evidence thereof has been presented by the North Dakota Government Agricultural Experiment Station as provided for in sections 7 and 8 of this act.

SECTION 5. The North Dakota Experiment Station to Inspect and Analyze Foods and Beverages. The North Dakota Government Agricultural Experiment Station shall make analysis of food products and beverages on sale in North Dakota suspected of being adulterated, at such times and places and to such extent as it may determine, and may appoint such agent or agents as it may deem necessary and the sheriffs of the respective counties of the state are hereby appointed and constituted agents for the enforcement of this act, and such agent or agents and sheriffs shall have free access, at all reasonable hours, for the purpose of examining into any place wherein it is suspected any article of food or beverage adulterated with any deleterious or foreign ingredient or ingredients exists, and such agent, agents or sheriffs upon tendering the market price of said article may take from any person, firm or corporation samples of any articles suspected of being adulterated as aforesaid, and the said Station may adopt or fix standards of purity, quality or strength when such standards are not specified or fixed by statute.

SECTION 6. Citizen May Send Sample of Food or Beverage For Analysis. Any citizen of the state may, by pre-paying the transportation charges, send any article of manufactured food or food product, or beverage, in the original package, to said Station to be analyzed. And such article if not before analyzed shall be analyzed

and included in the next report of the Station as provided for in section nine of this act.

SECTION 7. Facts, How Transmitted. Whenever said Station shall find by its analysis that adulterated food products have been on sale in this state, it shall forthwith transmit the facts so found
55 to the state's attorney of the county in which said adulterated food product was found.

SECTION 8. Certificates as Evidence. Every certificate duly signed and acknowledged by the chemist of the North Dakota Government Agricultural Experiment Station at Fargo relating to the analysis of any food, food products or beverage shall be presumptive evidence of the facts therein stated.

SECTION 9. Station to Make Annual Report. The said station shall make an annual report to the governor upon adulterated food products, and said report may be included in the report which the said station is already authorized by law to make to the governor, and in June and December of each year the said station shall furnish to the auditor of each county in the state a certified list of all adulterated foods, food products and beverages as found by such analysis, showing the name and brand of the article, the manufacturer and the name of the injurious adulterant. The county auditor of each county shall cause the said list to be published in the official paper of such county. Said publication shall be made in July and January of each year and shall continue for two successive issues to be paid for by such county at the rate allowed by law for publishing the proceedings of the Board of County Commissioners.

SECTION 10. Duty of Sheriff on Presentation of Complaint of Violation of This Act. Compensation. It is hereby made the duty of the sheriff of any county of this state on presentation to him of a verified complaint of the violation of any provision of this act, to at once proceed to obtain by purchase a sample of the adulterated food, food product or beverage complained of, and forward the same to the said Station for analysis, marking the package or wrapper containing the same for identification with the name of the person from whom procured, the date on which the same was procured and the substance therein contained. For his services hereunuder the said sheriff shall be allowed the same fees for travel as are now allowed by law to sheriffs on service of criminal process, together with such compensation as may be by the county commissioners of his county deemed reasonable, and all amounts expended by him in procuring and transmitting the said samples, which fees and amount expended shall be audited and allowed by the said commissioners and paid by his said county as other bills of said sheriff.

56 SECTION 11. Appropriation. To carry out the provisions of this act, out of any money in the state treasury, not otherwise appropriated, the sum of fifteen hundred dollars is hereby annually appropriated to the said North Dakota Government Agricultural Experiment Station, which sum shall be paid in equal quarterly installments to the treasurer of the board of trustees of said station, upon the order of the state auditor who is hereby directed to draw his order for the same.

SECTION 12. No Action in Court. No action shall be maintained in any court in this state on account of any sale or other contract made in violation of this act.

SECTION 13. Repeal. All acts and parts of acts inconsistent with the provisions of this act are hereby repealed.

Drug Law.

SECTION 1. Adulterating and Labeling Drugs. It shall be unlawful for any person, his agent or servant, or while acting as agent or servant of any other person or corporation to manufacture for sale, offer for sale, or sell within this state any drugs which is adulterated within the meaning of this act.

SECTION 2. Drugs Defined. The term "drug" as used in this act shall include all medicines for internal or external use, antiseptics, disinfectants and cosmetics.

SECTION 3. What Constitutes Adulteration. A drug shall be deemed to be adulterated:

First. If, when sold under or by a name recognized in the United States pharmacopoeia, it differs from the standard of strength, quality or purity prescribed therein, unless the order therefore requires an article inferior to such standard, or unless such difference is made known or so appears to the purchaser at the time of the sale.

Second. If, when sold under or by a name not recognized in the United States pharmacopoeia, but which is found in some other pharmacopoeia or other standard work on materia medica, it differs materially from the standard of strength, quality or purity prescribed in such work.

Third. If its strength, quality or purity falls below the professed standard under which it is sold.

57 Provided, That a drug or medicine shall not be deemed adulterated in the following case:

First. If the standard of strength or purity of any drug has been raised since the issue of the last edition of the United States pharmacopoeia, no prosecution relative to it shall be maintained until such change of standard has been published throughout the commonwealth.

SECTION 4. Drugs and Medicines to be Labeled. Every proprietary product, drug, medicine or beverage containing more than 5 per cent. of ethyl alcohol, or which contains chloral hydrate, ergot, morphine, opium or any of their compounds or derivatives, cocaine or any of its salts, bromine, iodine, or any of their salts, shall be clearly labeled in black open gothic letters printed on a white back ground showing the name and per centage of each of the foregoing constituents, and said label shall be affixed to each and every package, cartoon, box or bottle in such a way as to be clearly seen.

SECTION 5. Cocaine—How Sold. No sale or gift of cocaine or of its salts shall be made or delivery thereof made in this state except upon the written prescription of a licensed physician.

SECTION 6. Methyl Alcohol Prohibited. It shall be unlawful to sell, offer or expose for sale, or have in possession any preparation or

product, intended for the use of man, either for internal or external purposes, which contain methyl alcohol or "wood spirits."

SECTION 7. Physician's Prescription to be Filled. Nothing in this act shall be so construed as to in any way interfere with the written prescription of any regularly licensed physician or with the filling of the same by a licensed druggist.

SECTION 8. Penalty for So Doing. Any person violating any of the provisions of this act shall be deemed guilty of a misdemeanor and shall for the first offense be punished by a fine of not less than five dollars or more than one hundred dollars, and all necessary costs, including the expense of analyzing such adulterated articles when said person has been found guilty under this act, and all such adulterated or misbranded articles may, by order of the court be seized and destroyed.

SECTION 9. Duty of State's Attorney. It shall be the duty of the attorney general and state's attorney to prosecute all persons
58 violating any of the provisions of this act when the evidence thereof has been presented by the North Dakota Government Agricultural Experiment Station as provided for in sections 11 and 12 of this act.

SECTION 10. The North Dakota Experiment Station to Inspect and Analyze Drugs and Medicines. The North Dakota Government Agricultural Experiment Station shall make analysis of drugs and medicines found on sale in North Dakota suspected of being adulterated, at such times and places and to such extent as it may determine, and may appoint such agent or agents as it may deem necessary for the enforcement of the provisions of this act, and such agent or agents shall have free access and egress, at all reasonable hours, for the purpose of examining into any place wherein it is suspected any drug or medicine adulterated with any deleterious or foreign ingredient or which falls below the standard of purity or where such ingredients exist, and such agent or agents, upon tendering the market price of said article, may take from any person, firm or corporation samples of any articles suspected of being adulterated as aforesaid.

SECTION 11. Facts—How Transmitted. Whenever said station shall find by its analysis that adulterated drugs have been on sale in this state or that said drugs are in violation of this act, it shall forthwith transmit the facts so found to the attorney general and state's attorney of the county in which said adulterated product was found.

SECTION 12. Certificates as Evidence. Every certificate duly signed and acknowledged by the chemist of the North Dakota Government Agricultural Experiment Station at Fargo relating to the analysis of any drug, drug products or medicines, shall be presumptive evidence of the facts therein stated.

SECTION 13. Station to Make Annual Report. The said station shall make an annual report to the governor upon the work done under this act and said report may be included in the report which said station is already authorized by law to make to the governor.

SECTION 14. All goods coming into this state after July 1, 1905, shall be subject to the provisions of this act, while those goods within

the state prior to that date shall be considered as exempt until Jan. 1, 1906.

Approved February 28, 1905.

59 Requirements under Drug Law.

1. It is unlawful to sell any preparation intended for the use of man which contains methyl alcohol.

2. It is unlawful to sell cocaine or to give it away.

3. Products containing more than 5 per centum of alcohol must be labeled in open gothic letter to show the per cent. present.

said formaldehyde and a written or printed statement setting forth

4. Drugs or medicines containing chloral, ergot, morphine, opium, cocaine, bromine or iodine or salts of these must be labeled to show the amount of the constituent.

5. A drug falsely labeled is deemed adulterated.

6. A drug not of official strength is illegal.

Formaldehyde Law.

An Act to Prevent Fraud in the Sale of Formaldehyde Used as a Fungicide, Prescribing a Penalty for the Violation, Providing for the Inspection and Analysis of Same, and Charging the North Dakota Government Agricultural Experiment Station With the Duty Thereof, and Charging the State's Attorney with the Enforcement Hereof.

Be it Enacted by the Legislative Assembly of the State of North Dakota:

SECTION 1. Duty of Manufacturers and Dealers. It shall be the duty of each and every manufacturer of Formaldehyde (The Aldehyde of Methyl Alcohol) to be used as fungicide within the state, and of every dealer of original packages of said formaldehyde manufactured outside of the state, before the said formaldehyde is offered or exposed for sale, or sold within this state as a fungicide, or for fungicidal purposes, to submit to the Director of the North Dakota Government Agricultural Experiment Station at Fargo, samples of the brand or brands of said formaldehyde to be sold, the number of pounds contained in each retainer or container in which it is

60 put on the market for sale, the name or names of the manufacturers and the place of manufacturing the same.

Second. The statement shall set forth in per cent. by weight, the amount of formaldehyde contained in the said solution of formaldehyde, and the statement so furnished shall be considered as constituting a guarantee to the purchaser that every quantity, sold or offered for sale, shall contain not less than the amount of formaldehyde expressed in per cent. as set forth in the said statement.

SECTION II. Right to Sell in the State, How Obtained. Every purchaser of said formaldehyde in original packages, which is manufactured outside of this state, who intends to sell or expose the same for sale, and every manufacturer of formaldehy-e within this state shall, after filing the statement above provided for, with the Director

of the North Dakota Government Agricultural Experiment Station at Fargo, receive from the said Director a certificate stating that he has complied with the foregoing statement, which certificate shall be furnished without charge therefor; said certificate when furnished shall authorize the party when receiving the same to deal in this state in the said formaldehyde. Any person who fails to comply with the terms of section one of this act shall not be entitled to such certificate and it shall not be construed as applying to retail dealers selling formaldehyde which has already been labeled and guaranteed.

SECTION III. Legal Strength. Formaldehyde when sold, offered or exposed for sale, as a fungicide, in this state, shall contain at least forty per centum by weight of formaldehyde, and if it falls below 38 per cent. it shall be deemed adulterated within the meaning of the terms of this act.

SECTION IV. Duty of the Director. The Director of the North Dakota Government Agricultural Experiment Station at Fargo, shall secure different brands of formaldehyde sold, offered or exposed for sale within the state, and shall have said samples of formaldehyde analyzed, and for this purpose he may appoint such agent or agents as he may deem necessary, for the enforcement of the act, and such agent or agents shall have free access and egress at all reasonable hours, for the purpose of examining into any place wherein it is suspected any formaldehyde may be kept, and such agent or agents may take from any person, firm or corporation samples of said formaldehyde for analysis and when said goods are found on analysis
61 to be in violation of this law the said director shall report the said fact to the state's attorney for the district wherein the offense is committed.

SECTION V. Certificates as Evidence. Every certificate duly signed and acknowledged by the chemist of the North Dakota Government Agricultural Experiment Station at Fargo relating to the analysis of any formaldehyde shall be presumptive evidence of the facts therein stated.

SECTION VI. Duty of State's Attorney. It shall be the duty of the State's Attorney to prosecute all persons violating any of the provisions of this act when the evidence thereof has been presented by the North Dakota Government Agricultural Experiment Station as provided for in Sections 4 and 5 of this act.

SECTION VII. What Constitutes Violation: The doing of anything prohibited by this act shall be evidence of the violation of the provision of this act relating to the things so prohibited and the omission to do anything directed to be done shall be evidence of a violation of the provisions of this act relative to the things so directed to be done, and any person who shall sell any unbroken package of formaldehyde or any part therof which has not been labeled as herein provided, shall be guilty of a misdemeanor, and shall be fined not less than ten dollars nor more than one hundred dollars, together with the costs of the suit in an action caused to be brought by the Director of the North Dakota Government Agricultural Experiment Station in the name of the people of the State of North Dakota.

Emergency. Whereas, an emergency exists in that there is no

law regulating the sale of formaldehyde for fungicidal purposes, therefore, this act shall take effect immediately after its passage and approval.

Approved Feb. 17, 1905.

Formaldehyde Requirements.

1. Manufacturers or jobbers doing business in North Dakota must take out license.

2. A sample of the goods must be deposited at the Experiment Station together with a guarantee.

3. Licenses are issued by the Experiment Station.

62 4. Formaldehyde must be 40 per cent. in strength to be standard and must not fall below 38 per cent. to be legal.

5. It is the duty of the Experiment Station to investigate the strength of formaldehyde and to enforce the law.

Adulterated Paris Green.

(H. B. No. 42—Treat.)

Be it enacted, etc.:

SECTION 1. Duty of Manufacturers and Dealers. It shall be the duty of each and every manufacturer of Paris Green (commercial acetoarsenite of copper) to be used as an insecticide within the state, and of every dealer in original packages of said Paris Green manufactured outside of this state, before the said Paris Green is offered or exposed for sale, or sold within this state as an insecticide, to submit to the director of the North Dakota Government Agricultural Experiment Station of Fargo, samples of said Paris Green, and a written or printed statement setting forth: First, the brands of said Paris Green, to be sold, the number of pounds contained in each package in which it is put on the market for sale, the name or names of the manufacturers and the place of manufacturing the same; second, the statement shall set forth the amount of combined arsenic which the said Paris Green contains, and the statement so furnished shall be considered as constituting a guarantee to the purchaser that every package of such Paris green contains not less than the amount of combined arsenic set forth in the statement.

SECTION 2. Right to Sell in the State and How Obtained. Every purchaser of said Paris green in original packages, which is manufactured outside of this state, who intends to sell or expose the same for sale, and every manufacturer of said Paris green within this state, shall, after filing the statement above provided for, with the director of the North Dakota Government Agricultural Experiment Station at Fargo, receive from the said director a certificate stating that he has complied with the foregoing statement, which certificate shall be furnished without charge therefor; said certificate when furnished shall authorize the party when receiving the same to deal in this state in the said Paris green. Any person who fails to comply

with the terms of section 1 of this act shall not be entitled to
63 such certificate and it shall not be construed as applying to retail dealers selling Paris green which has already been labeled and guaranteed.

SECTION 3. Legal Strength. Paris green, when sold, offered or exposed for sale, as an insecticide, in this state, shall contain at least fifty per centum of arsenious oxid, and shall not contain more than four per centum of the same in the uncombined state.

SECTION 4. Duty of the Director. The director of the North Dakota Government Agricultural Experiment Station at Fargo, shall examine or cause to be examined different brands of Paris green sold, offered or exposed for sale within the state, and cause samples of the same to be analyzed, and for this purpose he may appoint such agent or agents as he may deem necessary for the enforcement of this act, and such agent or agents shall have free access at all reasonable hours, for the purpose of examining into any place wherein it is suspected any Paris green may be kept and such agent or agents may take from any person, firm or corporation, samples of said Paris green for analysis and when said goods are found on analysis to be in violation of this law the said director shall report the said facts to the state's attorney for the district wherein the offense is committed.

SECTION 5. Certificates as Evidence. Every certificate duly signed and acknowledged by the chemist of the North Dakota Government Agricultural Experiment Station at Fargo relating to the analysis of any Paris green shall be presumptive evidence of the facts therein stated.

SECTION —. Duty of State's Attorney. It shall be the duty of the State's Attorney to prosecute all persons violating any of the provisions of this act when the evidence thereof has been presented by the North Dakota Government Agricultural Experiment Station, as provided for in sections 4 and 5 of this act.

SECTION 7. What Constitutes Violation. The doing of anything prohibited by this act shall be evidence of the violation of the provisions of this act relating to the things so prohibited and the omission to do anything directed to be done shall be evidence of a violation of the provisions of this act relative to the things so directed to be done, and any person who shall sell or dispose of any package of Paris green or any part thereof which has not been labeled as herein provided, shall be guilty of a misdemeanor, and shall be fined not less than ten dollars, nor more than one hundred dollars,
64 together with the costs of the suit in an action caused to be brought by the director of the North Dakota Government Agricultural Experiment Station in the name of the people of the state of North Dakota.

SECTION 8. Emergency.

Approved February 18, 1905.

Adulteration of Paint.

(S. B. No. 49—McArthur.)

Be it enacted, etc.:

SECTION 1. Every person, firm or corporation who manufacturers for sale or expose- for sale, or sells within this state, any white lead, paint or compound intended for use as such shall label the same in clear and distinct gothic letters upon a white background and show the true per cent. of each mineral con-tituent contained in said paint, or if other than linseed oil is used in its preparation, the names of such oils or substitutes shall be shown together with the percentage thereof and every person, firm or corporation who manufactures for sale or exposes for sale or sells within this state any mixed paint or compound intended for use as such, which contains any ingredients other than pure linseed oil, pure carbonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors, shall be deemed guilty of a misdemeanor and upon conviction thereof shall, for each offense, be punished by a fine of not less than twenty-five and not more than one hundred dollars and costs, or by imprisonment in the county jail not exceeding sixty days; provided, that any such person, firm or corporation who shall manufactur- for sale or expose for sale, or sell within this state any white lead, paint or mixed paint containing ingredients other than those as above enumerated, shall not be deemed guilty of a violation of this act in case the same be properly labeled showing the quantity or amount of each and every ingredient used therein and not specified above, and the name and residence of the manufacturer or person for whom it is manufactured.

SECTION 2. The having in possession by any person, firm or corporation dealing in said articles, any articles or substances hereinbefore described and not properly labeled, as provided by section 1 of this act, shall be considered *prima facie* evidence that the same is kept by such person or firm, in violation of the provisions of this act and punishable under it.

SECTION 3. The director of the North Dakota Government Agricultural Experiment Station is charged with the proper enforcement of all the provisions of this act.

SECTION 4. The said director and the assistants, experts, chemists and agents shall be duly authorized for the purpose, and shall have access and ingress to all places of business, factories, stores and buildings used for the manufacture or sale of paints. They shall also have power and authority to open any package, can, jar, tub or other receptacle containing white lead paints that may be sold, manufactured or exposed for sale, in violation of the provisions of the act.

SECTION 5. This act shall take effect and be in force from and after January 1, 1906.

Approved March 6, 1905.

Paints to Comply with the Law.

1. All white lead or compounds intended for use as a substitute therefor must be labeled to clearly show the per cent of each mineral constituent.
2. All mixed paints must show their true composition unless made of pure linseed oil, lead carbonate, oxide of zinc, turpentine, Japan dryers and pure colors.
3. All substitutes for linseed oil, in the preparation of paints, must be clearly shown on the label.
4. It is the duty of the Experiment Station to enforce the provisions of this act.
5. Parties violating this act are liable to fine or imprisonment.

66 *Hints and Guides for Those Who Would Comply With the Pure Food Law, Drug and Other Laws.*

It is the duty of the Government Agricultural Experiment Station at Fargo, North Dakota, to examine all food products offered for sale in the state and when found to be adulterated to cause the offending party to be prosecuted for violation of the law.

By vote of the Board of Trustees of the Agricultural College the Chemist of the Experiment Sation (E. F. Ladd) becomes the Food Commissioner for North Dakota and is charged with the duty of enforcing the law in so far as it is made a part of the duty of the station.

Retail grocers and all merchants dealing in food products in making contracts for a new supply of goods should specify that the same must comply with the requirements of the Pure Food Law. Some of the conditions of this law are as follows:

1. All foods and beverages must be free from coal tar dyes.
2. They must be free from chemical preservatives; formaldehyde, benzoic acid, sulphurous acid boracic acid, salicylic acid, hydroflouric acid, saccharin, betnapthol or any salt or antiseptic compound derived from these products.
3. They must be labeled true to name in every respect.
4. Every package, bottle or cartoon must bear the true net weight.
5. It must bear the true name of the manufacturers or jobbers.
6. It must show the true grade of class of the goods.
7. The use of benzoate of soda one part in 2000 is permitted in certain classes of perishable goods sold in bulk.
8. If any essential constituent has been removed the substance is adulterated.
9. If any substance has been added so as to deceive or mislead the purchaser the product is adulterated.
10. Mixed or compound substances may be sold when properly labeled.
11. Vinegars must be sold under true names. Cider vinegar must be made wholly from apples.

67 12. The sheriffs in each county are deputies for guarding against the sale of adulterated food products in each county.

13. The station is authorized to fix standards of purity, quality or strength.

14. Any citizen may have foods analyzed at the Experiment Station.

15. Twice each year county auditors must publish in the official county paper a list of all adulterated foods found on sale in the state.

16. If adulterated goods are sold no action can be maintained in any court in the state for the purpose of collecting outstanding bills for the same.

17. The court may confiscate goods found to be adulterated.

18. The state's attorney must prosecute all persons violating the law when evidence has been furnished by the Station.

19. Coffees must be pure, free from chicory, unglazed not polished and not extracted.

20. Extracts must be pure and what they claim to be.

21. Candies must not contain coal tar dyes or harmful products.

22. Meats must not be colored or contain preservatives.

23. Sausages must not contain tainted or decomposed meats, must not contain prohibited preservatives, coal tar dyes or starch fillers.

24. The Food Commissioner, his agents, the sheriffs or their deputies, shall have free access at all reasonable hours, for the inspection of foods.

Preservatives Permitted.

Until further notice the use of benzoate of soda in accordance with the terms of the food law (section 2, clause 4 of the provision) is deemed permissable in tomato catsup, in crushed fruits intended for use at the soda fountain, in natural fruit syrup prepared for soda fountain use and in bulk ciders from natural fruits.

Baking Powders.

All baking powders must be labeled in accordance with the following:

68 1st. It must give the true name of the manufacturer.

2d. The label must not contain any advertising or descriptive matter.

3d. The directions for use may be given on the label.

4th. It must show the true net weight of the can, package, or cartoon.

5th. There shall be printed on a light colored label in clear and legible type the following: "This baking powder contains the following constituents and none other." There shall follow in the plainest English words an enumeration of the constituents contained in said baking powder.

The use of sulphites is prohibited in all food products.

Cream of tartar must be free from alum, phosphate, lime salts or other foreign constituents.

Candy.

Candy. Candy must be free from inert mineral matter, it must contain no terra alba, barytes, talc, chrome yellow or other mineral substance or aniline (coal tar dyes) or other colors or flavors detrimental to health. They should contain no saccharine, sulphites, or paraffin.

Canned Goods.

Canned goods must be free from all coal tar dyes or other foreign colors, bleaching agents, fillers (as starch or flour in corn) chemical preservatives or saccharine and be preserved by sterilization with heat only. Copper salts, alums, or iron salts are not permissable in peas, beans, etc.

Soaked Good. All products put up from previously dried or partially desiccated products shall be plainly labeled "Soaked" in letters not less than two line pica in size.

69 Coffees, Cocoas, etc.

Coffee must be true to name. It must not be coated or polished to conceal inferiority. It must contain the extractive volatile matter natural to coffee.

Coffee Compounds. Compounds of Coffee and chicory, or of coffee and other harmless substitutes allied to it in flavor and strength and not intended simply as an adulterant may be sold when properly labeled "Coffee Compounded." Imitations containing no coffee cannot be sold as coffee compounds. They may be sold under coin names not intended to deceive.

Chocolate. Plain or Bitter, is the solid or plastic mass obtained by grinding cocoa nibs without the removal of fat or other constituents except the germ or without the addition of foreign constituents.

Sweet Chocolate and Chocolate Coating are plain chocolate mixed with sugar (sucrose), with or without the addition of cocoa butter, spices, or other flavoring materials.

Cocoa or Powdered Cocoa is cocoa nibs, with or without the germs, deprived of a portion of its fat and finely pulverized, but without the addition of foreign matter.

Sweet or Sweetened Cocoa is cocoa mixed with sugar. (Sucrose.)

Condiments, Spices, etc.

All Spices must be pure. The mixture of any foreign substance with any spice is an adulteration. The extracting of the active principal of any spice as extracting or removing the oil from cloves or the active principal of ginger is an adulteration.

A mixed or imitation product must not be labeled so as to mislead or deceive the purchaser. The word "Compounded" before or after the name of the spice is not a proper labeling for imitation or adulterated product.

Catsup must be made from ripe tomatoes without the addition of

a filler, saccharin or foreign color. (For preservatives see page 17.

70 Pickles must be true to name, free from saccharin, preservatives, copper salts, alums or iron salts.

Extracts.

Lemon Extracts must contain not less than five per cent. of the pure oil of lemon dissolved in ethyl alcohol and to be standard should contain the extractive matter from lemon skins and must be free from foreign coloring matter.

Vanilla Extracts shall be made wholly from vanilla beans, and shall be free from any artificial coloring matter.

All other extracts shall be labeled true to name.

Artificial or Synthetic Extracts may be sold when labeled "Artificial" "Extracts," but when the same natural extract is made from the fruit itself an imitation product shall not be sold.

Terpenelers Lemon Extract of Flavor is considered a permissable labeling for harmless substitutes for lemon extract for the use of bakers' and bottlers' goods to be sold in bulk.

Fruits, Jellies, Jam, Preserves, etc.

These must be free from coal tar dyes, must not be colored and labeled to imitate some other product so as to deceive or mislead the purchaser. They must be free from all prohibited or other injurious preservatives. They must be sweetened with sucrose and made exclusively of the fruit specified in the name.

Glucose, Jellies, Jams, etc., are made from pure fruit or fruit juices sweetened with glucose or sucrose and a statement as to the per cent. of each.

Imitation Fruit, Jellies, Jams, etc., are substitutes for fruit jellies and made from glucose or other harmless products free from preservatives, coal tar dyes, etc.

Every artificial product made in part or in whole of glucose, dextrine, starch or other substances not injurious to health may
71 be distinctly labeled "Imitation fruit, jelly, jam or butter," but must not contain the name of any fruit so as to deceive or mislead the purchaser.

Dried Fruits should not contain worms and be free from zinc, lead, or bleaching agents, etc.

Meats, etc.

Meats of all kinds must be free from the products of decomposition, without coal tar colors, or chemical preservatives (such as sulphites, borates, aluminium salts, etc.,) and must be true to name.

Smoked Meats to be standard and legal must be prepared by the natural process of smoking, that is by the actual subjection of the meat to the influence of smoke from wood.

The use of chemical preparations for treating meat as a substitute,

in whole or part, for smoking does not entitle the product to be called "smoked meats."

Sausages are finely divided or hashed meats mixed with spices and flavoring, cooked or uncooked and free from chemical preservatives, coloring matter or starch.

Starch Fillers. The use of starch, flour, or potato flour as a filler for sausage and other prepared meats is deemed to be an adulteration, and meats found to contain such a filler will be treated as illegal.

Syrup, Molasses, etc.

Maple Syrup or Molasses must be the product prepared exclusively from the sap of the maple tree.

Maple Sugar or Concrete is the product prepared by evaporation to crystallization of the sap of the maple tree without the addition of sugar from other sources.

Glucose Syrup or Corn Syrup is a product of the action of acid on starch and it must be free from acid or sulphites.

72 Sorghum Syrup or Molasses is syrup made exclusively by evaporating the juice of the sorghum plant.

Molasses is the product from the juices of the sugar cane and without the addition of glucose.

Vinegars.

All vinegar must contain at least four per cent. of absolute acetic acid carrying in solution, if undistilled, extractives from the fruit, grain, vegetable or syrup used in their preparation. The term "Vinegar" is limited to water solution of acetic acid derived from alcohol by fermentation.

Cider or Apple Vinegar must be made wholly from the fermented juice of the apple. Artificial or other vinegars fortified with another must not be sold as cider vinegar. The addition of apple pomace or apple jelly to vinegar does not entitle it to be sold as cider vinegar.

Malt Vinegars must be made entirely from an infusion of malted grain.

Wine Vinegar is the product made by the fermentation of the juice of grapes.

Spirit, Distilled or White Vinegar is the product made by the acetic fermentation of distilled alcohol.

General Rule.

Whenever the words "Artificial," "Compound," or "Imitation," etc., are permissable and used these words must be printed immediately preceding or following the word they are intended to modify, in the same size type and equally prominent with the words they modify.

73 EXHIBIT B.

North Dakota Agricultural College.

Government Agricultural Experimental Station of North Dakota.

Bulletin No. 67.

Paints and Paint Products.

By E. F. Ladd and C. D. Holley.

Any farmer, teacher or student in the State may have this Bulletin mailed to his address, free of charge, upon application.

Fargo, North Dakota, U. S. A.,

December, 1905.

Filed Jan. 5, 1906. J. A. MONTGOMERY, *Clerk.*

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Paints and Paint Products.

By E. F. Ladd and C. D. Holley.

Introduction.

The legislative assembly of North Dakota, at its ninth session, enacted into a law a bill, introduced by Senator McArthur, of Bottineau, for the purpose of preventing adulteration and deception in the sale of paints. This law goes into force January first, 1906.

It is made the duty of the director of the experiment station, together with his assistants, to see that this law is enforced. Unfortunately no appropriation was made for carrying out this work and whatever is accomplished must be done as a personal matter by those who are interested in seeing that the law is properly enforced and by the experiment station whose officers are charged with the investigation of paints. This law has been severely criticised by some paint manufacturers and by others it has been looked upon as a step in the right direction.

Since this is the first comprehensive law of the kind passed by any state legislature it is not unlikely that the measure may be imperfect and that experience will show the necessity for changes at the coming session of the legislature. It is not unlikely that it will be found wise to specify, as is done in fertilizer laws, the manner in which the analyses shall be expressed on the label. Certain manufacturers have maintained that this law is unconstitutional. This is a matter for the courts to decide and at the present time, it is announced that proceedings will be started early in January by certain paint manufacturers to prevent the enforcement of this law. Therefore, it seems well to place before the public such information as we have regarding paints and paint products and to discuss in some detail the character of the various products entering into the preparation of the paints.

That there are some paints upon the market which are not desirable products cannot be denied and the people have as much right to know which paints are what they are represented to be as they have to know that commercial fertilizers are what their
76 manufacturers claim for them. It should be borne in mind, however, that if certain well-known paints are not in accord with generally accepted views as to what constitutes a perfect paint, we should not at once conclude that the products are entirely worthless. We may as well be justified in concluding that some of these combinations are superior for the purposes intended. The paint that stands the test of twenty or twenty-five years and gives general satisfaction is not to be turned aside simply because it is shown that the paint is not in chemical composition what we had assumed to be the recognized standard.

On the other hand, those paints which contain constituents which are recognized as lowering its value, or injuring its quality and which the unscrupulous manufacturer tries to hide from the public, by carefully worded advertisements and guarantees, should be made known to the consumer in order that he may make an intelligent

selection of the paint he will employ. Thus far we have not found a single statement from a reliable source showing that the presence of either water or alkaline soap solutions add anything to the value of paint.

With regard to inert minerals entering into the pigment, there is much more to be said. Some of these may have value when properly mixed in combination with the true basic constituents of paint pigments. On the other hand, when these constituents constitute the bulk of the paint, and the public are led to assume that the product is made up of white lead or white lead and zinc, then a fraud is being practiced which is no more honorable on the part of the manufacturer of paints than it is on the part of the manufacturer of commercial fertilizers.

In the present bulletin we shall deal only with white paints, intended for inside and outside use, leaving all other shades to be discussed in future bulletins when the work is more fully completed. The subject of oils, oil substitutes and dryers will also be fully discussed by Mr. Holley in our forthcoming annual report and therefore will not be considered at this time. In the analyses as given in these pages we have used the term "vegetable oil" rather than linseed oil, assuming, of course, that the product is pure linseed oil.

In some cases, however, further work is necessary in order to determine the true character of some of these oils. It is possible that in some instances, the seed from which the oil has been extracted contained no inconsiderable amount of foreign weed seed, rape seed, etc. It is possible, too, that there are substitutes which to some extent, have found their way into some of these oils but this will
77 be discussed more fully at an appropriate time.

The term "volatile oil" should mean turpentine as given in these analyses. In some instances it is known that other than turpentine is included under this head. A further separation and study of these products will be made and the data presented in a future report.

As showing what others interested in paint work, have found in their experience I quote from Sabin:*

"No turpentine or benzine should ever be allowed about the premises while this work is going on. Most of the failures of lead and zinc paints is due to the use of these volatile thinners, ——."

Jennings, in Paint and Color Mixing says, "There is not much doubt that the best pigments may be replaced with others somewhat inferior without so much detriment to the quality of the paint as if linseed oil is replaced by some other oil. It is quite necessary that pure linseed oil be used in the manufacture of all paints, and although there are one or two substitutes on the market which may be employed in very cheap work, no attempt should be made to execute a really good job unless pure linseed oil is used."

He further says, "It is very important that the turpentine used in the paint be pure. American turpentine is mostly used. Owing

*Industrial and Artistic Technology of Paint and Varnishes, page 312.

to its high price it is sometimes adulterated with disastrous effects upon the paint."

If the paint authorities consider it so important that only pure linseed oil and pure turpentine should be used in order to secure the best results and if paint manufacturers insist that only the purest and highest grade of linseed oil and turpentine shall be employed in thinning paints in so far as may be found necessary when they are ready for use, then why should these manufacturers be permitted to use substitutes for oils which are of questionable value without informing the public of their presence. The very fact that some manufacturers are opposing the law, so strenuously at the present time and are proposing to fight it through the courts, hoping to defeat the purpose intended by the legislature, indicates that there is some reason for keeping away from the public the desired information.

There are certain paint manufacturers whose goods do not, under the present law, require any labelling and other manufacturers have indicated their intention to so modify their formulas as to
78 make it unnecessary to label their goods for North Dakota trade. Certainly, opposition to the present paint law will not result in benefit to manufacturers who will later need to explain their attitude before the public, but the law must react to the benefit of those who are willing to comply with its requirements.

I believe our readers will be interested in, and benefited by, reading quotations taken direct from the paint literature sent out by the paint manufacturers themselves. With regard to the character and value of certain constituents in the pigments and liquid portions of paints as now found upon the markets we quote the following:

In Paint in Architecture, Stanton Dudley says, "The universal approved menstrum for protective paints is pure linseed oil. There is no known substitute for it though the market is full of adulterated oil and paint containing it——."

"The usual adulterants are petroleum oil, cotton seed oil, rosin oil, and fish oil. In prepared paints the commonest adulterants are alkaline, emulsifying agents which permit of the introduction of cheap petroleum products and water."

"If all ready-mixed paints were made containing a pigment of pure linseed oil, turpentine and Japan dryer they would probably long since have displaced all other forms of paint. Unfortunately, however, the desire for cheapness has led to the discovery that by the addition of alkalies, oil can be made to mix with water and benzine has been found to be a possible substitute for turpentine."

"Adverse experience with such compounds is the secret of the commonest protest against ready-mixed paints."

Heath & Milligan Manufacturing Company say, "Linseed oil is conceded to be the life of the paint." They further say, "It is linseed oil which gives the life, elasticity and durability to the combination, holding the pigment together and to the surface, while the pigment is that which hides, covers, protects and prolongs the life of the linseed oil. They further say, "Not a drop of anything but pure

linseed oil and turpentine should be added to the best prepared paint and they should only be added as noted in the directions."

They further say, "The market is so flooded with substitute linseed oil and bogus paint oils of various kinds, that great care should be taken to get pure linseed oil of some reputable make. If any oil other than pure linseed oil is used in the reduction of this paint, we will not be responsible for results and will not guarantee satisfaction from its use.

In Paint Queries, Patton has the following:

79 What hurts the quality of paint most?

Answer. Adulteration in the liquids.

What are the most common adulterants in the liquids?

Answer. Water and benzine.

How can one easily learn if these adulterants are used?

Answer. You can at once detect the presence of benzine by the smell.

If water is in the paint, a piece of gelatine will get soft if left in the paint over night.

Will gelatine get soft in pure linseed oil paint?

Answer. No.

Why is water put in paint?

Answer. To cheapen it.

Is that the only reason?

Answer. No.

What else does water do in paint?

Answer. It makes paint look thicker.

What is the object of that?

Answer. To cause the people to believe they are getting more for their money.

In what way?

Answer. They are told that pure oil costs less per gallon than paint, so they can add the oil and make that saving.

What is the truth about this?

Answer. Paint makers furnish the water which costs nothing and you furnish the oil. You are the "cat's paw."

Hammar Brothers White Lead Company say, "We knew that every new, improved patent process lacks some one possible necessity that has made and kept Old Dutch Process the standard of quality for 400 years or more. It costs less money to put up a factory to make quick process lead but it does not make as good lead."

In Facts and Figures, Patterson, Sargent Company say, "No one can deceive us with a "quick process" or adulterated white lead, or a "new process" linseed oil, cotton seed, corn oil, or petroleum mixtures; and we do not overstate the case when we say that fully one-half of the so-called linseed oil on the market today is adulterated."

They further say, "Do not thin with or add anything but pure raw linseed oil, except in the following cases."

They further say, "Don't paint during wet or frosty weather."

In paints, why, how and when we find the following:

80 "The ready-mixed paints have always contained zinc white and many of the cheaper kinds also contained water and alkali (potash or soda) and so little linseed oil that they gave

very poor service; and ready-mixed paints of all kinds fell into bad repute because of the faults of the worst kind."

Further it says, "But in every case those who know most about paint insist that it shall contain no water and no oils beside pure linseed oil."

The National Lead Company say, "Linseed oil is the only oil that has the important quality of drying paint." "Other oils will not dry but leave the paint soft so that it may be easily rubbed or scraped off."

They further say, "A great many packages are labelled "Pure White Lead," which are not pure white lead at all and sometimes do not contain a trace of white lead."

Patton, in Color Schemes for House Painting says, "Many paints contain water. Water, we need hardly state, has absolutely no paint value. It is used as an adulterant, to displace oil; and, more serious, its presence indicates that an alkali has been used. Oil and water will not mix without the addition of an alkali. The water, the oil, and the alkali make a thick, "livered" mixture, and those who do not know the "trick of the trade" think they are getting more for their money. Furthermore, the alkali injures the oil, shortens its life. If a paint contains water it is not a good paint."

Carter White Lead Company says, "There is no bleacher, no zinc white, no barytes, no water, no mineral oil—ingredients that have no place in a pure product."

Sears, Roebuck & Company, in How to paint say, "Be sure that the oil you are using is absolutely pure as there is nothing on the market just as good."

In a little pamphlet being distributed by paint men we have the following, "Paint will blister, peel, etc., if inferior oil, etc., are used as thinners. Thin with nothing but pure raw linseed oil, except where it is necessary to use turpentine. Paint most certainly will not adhere to a damp surface."

We have quoted from paint men themselves in order to show that those who have spoken upon the subject condemn the use of substitutes for linseed oil. These paint men themselves say they will not be responsible for the results if anything but pure linseed oil is used in reducing paints. If this is true, then why should the paint men "dope" their paint with water, alkali, etc. In other words, if it is not good enough for the consumer to use why do the paint men put these constituents in? If water and alkali constitute a
81 fraud, why should not the public know it and have an opportunity to judge of the character of the paint which they desire to use upon their buildings?

The further discussion of this subject we leave for some future occasion. For the present, the public may well draw their conclusions from the statements quoted from the paint manufacturers themselves as given above, and from the result of analyses as given in the following pages:

The White Pigments.

Paint has been used for decorative purposes from prehistoric times. Its principles of manufacture and essential components are very generally known. It is composed of the pigment which gives the paint its color and the oil or other liquid which forms the fluid part of the paint, technically called the vehicle.

The pigment should be permanent under the action of light and air. It should have good spreading or covering qualities and above all the power to hide or obscure thoroughly the surface over which it is spread.

The vehicle should be capable of drying or hardening in a suitable length of time, firmly cementing the particles of pigment to each other and to the surface to which the paint is applied and should remain unaltered by light, air and ordinary conditions of moisture for several years. A paint properly made and applied with reasonable care and under suitable conditions should not crack or chalk readily.

Basic Carbonate of Lead—Trade Names—White Lead, Corroded Lead.

White lead is the most important of all our pigments and is among the oldest, the native carbonate, cerussite having been in common use among the Romans. These deposits being limited in extent and distribution gave increased incentive for the manufacture of an artificial white lead reference to which is made as far back as 1622 and with few modifications is in extended use yet and yields a product which is preferred by many painters to the lead manufactured by most of the newer processes.

White lead is a basic lead carbonate the better forms of which correspond to the formula 2PbC03, Pb (0H)2 in which there are two molecules of lead carbonate to one of lead hydroxide. As it appears on the market, white lead is either dry or mixed with about nine per cent. of raw oil. However, there are some white leads on the market, termed pulp white leads which contain considerable amount of water along with the oil, it being claimed that these leads work easier under the brush.

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Prepared according to the Dutch Process or its modifications, white lead is a very heavy white powder, having a specific gravity of about 6.47, a cubic foot of the dry powder weighing about 185 pounds. According to Hurst, "white lead possesses all the good qualities desired by a painter—viz., good color, body, covering power and permanency. It is distinguished from all other pigments by the ease with which it mixes with oil and by forming a paint which readily flows from the brush, whereas most pigments, as for instance, barytes, tend to work what the painter calls slimy or livery, and streaky; white lead does not exhibit this property, but flows freely and evenly from the brush."

Paste white lead, usually sold in kegs, is very frequently adulterated, the pigment most used for this purpose being barytes, which very nearly approaches white lead in specific gravity and on that

account is not so readily detected and its coat is only a very small fraction of that of white lead.

Sublimed White Lead—This product is so named because it is prepared by a sublimation process. The product is obtained directly as a very fine, impalpable, white powder, without grinding. Chemically it is very different from ordinary white lead, being apparently a basic sulphate of lead and as prepared by the Picher Lead Company of Joplin, Mo., has approximately the following constitution:

Lead sulphate	75 per cent.
Lead oxide	20 per cent.
Zinc oxide	5 per cent.

The lead oxide is present not as the yellow litharge, but apparently as a white oxy-sulphate. Its presence has been found to greatly increase the body of the paint, making it entirely different physically from ordinary lead sulphate. The zinc oxide is incidental to the manufacture.

The specific gravity of sublimed white lead is 6.2 approximately that of ordinary white lead. It exceeds in the fineness of the particles the ordinary grades of white lead and is, at least, equal to them in whiteness, body, covering power and wearing qualities. It differs from the ordinary white leads in being non-poisonous and resists the blackening action of the sulphur compounds of sewer gas and of fuel gases to a much greater degree.

Zinc Oxide—Trade Names, Zinc White, Chinese White.

83 Zinc white is used very extensively at the present day as a pigment and constitutes nearly 50 per cent. of the total pigment in the majority of mixed paints. Being an artificial product, its composition varies widely and its price governed accordingly. Some of the cheaper oxides contain sulphate of zinc which is considered harmful as it is soluble in water and is liable to cause the paint to streak.

The following analyses given by G. H. Ellis in his treatise on White Paints fairly represents the composition of the commercial zinc oxides:

	Zinc White.	Zinc White.	Zinc White.	Zinc White.
Zinc oxide	82.84	96.00	93.23	93.23
Lead sulphate	15.57	3.57	4.81	4.81
Zinc sulphate	1.60	.....	.....	.....
Lead oxide	.....	.....	.....	.....
	100.01	99.57	98.04	100.00

Zinc oxide is a rather bulky, fine white powder, having a specific gravity of about 5.6. It generally has a slightly bluish tinge. It is unchanged by exposure to air and light, sulphur gases having no visible action as the sulphide formed is white. Hence as a pigment

it is very permanent. For preparing a still paste in which form it is often sold, it requires about 22 per cent. linseed oil, a much larger proportion than is required by any other pigment. The chief fault with zinc white is its want of body, *i. e.*, hiding the surface over which it is spread, which is not equal to that of white lead, though its covering power is considerably better.

Zinc Lead White—This pigment which has made its appearance within the last few years and which is practically unknown to the general public is prepared from low grade zinc-lead ores which also usually carry small quantities of copper, silver and gold, the latter metals being exhausted after the removal of the zinc and lead. As prepared, it is apparently a molecular combination of zinc oxide, lead sulphate and small proportions of lead carbonate and oxide. The combination, if it may be so termed, being affected at a high temperature while the metals are in the form of vapor, the union is far more intimate than could be obtained by grinding together the separate component pigments.

In physical appearance the zinc lead whites closely resem-
84 ble a good grade of zinc oxide, but their specific gravity is higher and their density greater. This difference becomes more noticeable on grinding with oil, the proportion of oil taken up being much nearer to the figure for Dutch process white lead than to that for zinc oxide. The density *for Dutch process white lead than to that for zinc oxide. The density* or obscuring power of the resultant paint places it in the lead rather than in the zinc class. The chief objections made to it are that it is not always uniform in composition or in color. An average of a large number of analyses gives it the following average composition:

Lead sulphate	48.10
Lead carbonate	0.50
Lead oxide	0.60
Zinc oxide	50.50
Zinc sulphate	0.30

G. H. Ellis, however, reports some analyses of zinc lead whites carrying from 1.16 to 5.12 per cent. sulphate and considers this constituent in appreciable quantities as decidedly harmful.

Barium Sulphate—Trade Names—Barytes, Blanc Fixe.

Barytes is one of the most important white pigments at the disposal of the paint manufacturer and ranks next to white lead and zinc white as to the extent of its use although its qualities as a pigment are much inferior. It occurs native in large quantities forming the minerals, heavy spar and barytes.

Barytes, is a fine heavy, white powder, insoluble in acids and alkalies, specific gravity about 4.6. It has more or less of a crystaline structure and in body is much inferior to white lead or china clay.

Blanc Fixe or Artificial Barytes is obtained as a fine precipitate when sulphuric acid or a sulphate is added to a solution of a barium

salt and is thus obtained as a by-product in some of the chemical industries. Chemically, it is barium sulphate the same as barytes. It has greater coloring power, and body and is more amorphous than the natural barytes. It is also more expensive.

Thorp sums up the properties of barium sulphate as a paint pigment as follows:

"Barytes is very heavy, is not effected by sulphur nor other chemicals and may be mixed with all pigments. It has little body and does not work well in oil, having a streaky appearance when applied, and drying very slowly. Owing to its weight, one of its chief uses is to adulterate white lead."

Sulphide of Zinc Whites—Trade Names—Charlton White, Lithophone, Ponolith, etc.

85 During the past twenty-five years considerable attention has been given to the manufacturer of zinc sulphide whites and at the present time they are being manufactured on a large scale and are found on the market under a variety of names as indicated above.

Zinc sulphide possesses what to the painter is of great importance, "body," *i. e.*, opacity or the ability to hide or obscure the surface over which the paint is spread. It, however, possesses the defect that its color is apt not to be good but by introducing other bodies and preparing the sulphides in a special manner, a pigment having good color and good "body" may be obtained. The exact composition of the pigment will depend upon several factors, the proportion between the barium and zinc salts used may be varied, while duration of the calcination to which the pigment is subjected will influence the result by increasing the proportion of oxide in the pigment.

As made by this process, Orr's white has the composition—

Barium sulphate, $BaSO_4$	69.915	per cent.
Zinc sulphide, ZnS	14.698	per cent.
Zinc oxide, ZnO	13.337	per cent.
Water	2.050	per cent.
	100.000	

A sample of lithophone, another of the zinc sulphide whites examined by Hurst had the following composition—

Barium sulphate, $BaSO_4$	67.96	per cent.
Zinc oxide, ZnO	7.32	per cent.
Zinc sulphide, ZnS	24.85	per cent.

The zinc sulphide whites have a body usually equal to that of white lead and often superior to it and also possesses the advantages of not being discolored by hydrogen sulphide and of being non-poisonous. They mix well with all pigments except those having lead or copper as their base. In which case, they are apt to cause a black discoloration due to the sulphur they contain. They are used chiefly for inside white house paints, for which purpose they find a very wide use in Europe and their use is extending rapidly in this country.

Calcium Carbonate—Trade Names—Paris White, Spanish White, English White or English Cliffstone, Whiting, Marble Dust.

86 Calcium carbonate is sold under all of these names and each corresponds to the formula $CaCO_3$, but there may be considerable difference in their physical properties which will be noticed later. Calcium carbonate occurs native in large masses, widely distributed. The variety used as a paint pigment is chalk. Some of the higher grades of which are found in France and England.

For use as a pigment the crude chalk is ground to a fine powder, settled in water to free it from coarse particles and finally dried very carefully avoiding an excess of heat which conve-ts the calcium carbonate into calcium oxide which has powerful alkaline properties acting vigorously on the oil with which it may be mixed. As prepared in this way it is usually sold under the name of whiting. Paris white is a finer quality of whiting due to more careful grinding. Spanish white is an old name given to Paris white which has been dried in the open air. Marble dust is a very cheap form of calcium carbonate obtained from marble.

Whiting is a dull white powder of an amorphous character, moderately heavy, having a specific gravity of about 2.6. It is insoluble in pure water, but in water containing carbonic acid gas it is soluble to quite an extent. It is subject to the defect that when mixed with oil it loses its white color and turns a dirty grey. Mixed with about 18 per cent. linseed oil it forms our commercial putty. Hurst states that it is quite permanent as a pigment. Its capacity for oil is high, requiring nearly three times as much oil to grind into a stiff paste as white lead.

Calcium Sulphate—Trade Names—Gypsum, Terra Alba, Mineral White.

Gypsum is a mineral found in many parts of the world, chemically it is calcium sulphate having two molecules of water of crystallization. For use as a paint pigment the native mineral is ground and treated in exactly the same way as barytes. When heated to 300° F. it loses its water of crystallization and becomes -he commercial plaster of Paris, which has the well known property of combining with water, forming a hard rock-like mass, serving many ornamental and useful purposes.

Calcium sulphate is also prepared commercially, being a by-product in several chemical industries.

Gypsum as it appears on the market is a fine bluish-white powder, much lighter in weight than white lead or barytes but is rather heavier than china clay or zinc white. Hurst states that its body is not as good as that of white lead and is rather transparent when mixed with oil but mixes well with water, being slightly soluble in the latter liquid about one part in 500.

87 China Clay.—This pigment like the preceding one is widely distributed in nature and only requires levigating and drying to prepare it for use as a pigment. China clay is essentially a hydrate silicate of alumina, the average composition being—

Silica, SiO_2	47 per cent.
Alumina, Al_2O_3	40 per cent.
Water, H_2O	13 per cent.

which corresponds to the formula—

$2SiO_2 . Al_2O_3 . 2H_2O$.

But as a rule the composition varies somewhat according to the locality in which it is found.

As it appears upon the market it is a fine white amorphous powder, having slight adhesive properties. It has a specific gravity of 2.2 being the lightest of all white pigments. It is insoluble in water and as a pigment it is quite permanent, but when mixed in oil it loses its body and becomes more or less transparent.

Silica—Trade Names—Silex, Silver White.

This pigment is usually prepared by grinding quartz to a very fine powder which after careful screening or levigating to free from the coarser particles is ready for the market. In oil it possesses very little body or obscuring power but when in a sufficiently fine state of division possesses considerable covering power. It is at the present time finding considerable use in mixed paints.

Other White Pigments—Practically, the only white pigment in use in this country outside of some of the other very slightly used lead whites, are magnesium silicate, sold under the trade names of talc or ground soapstone, and barium carbonate. But the occurrence of these two pigments in paints is so rare that they will not be considered in detail.

Comparison of the Properties of Some of the White Pigments—Pigments possess three essential properties available for paint making, viz., color, body and covering power. A series of experiments was carried out by George H. Hurst to ascertain the coloring power of various white pigments. Ten grams of each white was taken and mixed with a quantity of black to produce a uniform grey tine.

	Grams of black used.	Coloring power.
White lead	1¼	125
Zinc white	2	200
Barytes	1	100
Whiting	2	200
China clay	2	200
Gypsum	1½	150

88 By *covering power* is really meant the spreading color of a pigment, that is, when mixed with oil, etc., into a paint of suitable consistency, this paint can be spread over a certain extent of surface.

Hurst reports the following series of experiments on the covering power of several of the white pigments. Two grams of each were weighed out and mixed with sufficient raw linseed oil as would enable them to be rubbed over the surface of glass plates and the extent of surface covered by each was observed.

White lead (Dutch process)	760
Zinc white	1152
Barytes	1144
Gypsum	1440
Orr's White (Charlton White)	1500

"The quality of a pigment must not be judged solely from the point of view of its covering or spreading power, as gypsum would be considered one of the best pigments for oil while, as a matter of fact, it is one of the worst." The question of pigments retaining their whiteness on being mixed with oil is also very important. Barytes and gypsum are rather deficient in this respect while whiting is notably so as shown in putty.

"By body is meant the power of hiding the surface over which the pigment or paint is spread. Thus while the covering power of zinc white is better than that of white lead its body is far inferior." Body is one of the most important, if not the most important, property of a pigment. Hurst places the following pigments in the following order as regards body, "white lead, zinc white, barytes, gypsum, the latter being very transparent." China clay is also more or less transparent. Whiting or calcium carbonate in its various forms would probably be placed along with barytes, according to its quality.

The quality of linseed oil required to grind some of the white pigments into a stiff paste is given by Hurst as follows:

White lead	7½	per cent. of oil.
Zinc white	22	per cent. of oil.
Barytes	7	per cent. of oil.
Calcium carbonate	18	per cent. of oil.

The cost of the various pigments is of prime importance to the paint manufacturer and the following table of quotations from the November number, 1905, of "Drugs, Oils and Paints," Philadelphia, under the heading of "Current Wholesale Prices" will be of interest.

89 Name of Pigment.	Cents per pound.
American white lead, dry, in bbls.	6½ to 7
Sublimed white lead, carload lots	5
Standard zinc lead white, car lots	3¾
American zinc lead white, dry	4½ to 5
Barytes, per ton, $13.00 to $25.00	65-100 to 1
China clay, per ton, $14.00 to $20.00	7-10 to 1
Whiting, Commercial by the 100 lbs. $55-$65	55-100 to 65-100
Paris white, English Cliffstone	1
Terra Alba, per ton, $9.50 to $15.00	48-100 to ¾

Silex or lithophone is not given but a recent number of the Oil, Paint and Drug Reporter gives the following quotations:

Lithophone	3¾ to 7
Silex, per ton, $12.00 to $40.00	6-10 to 2

Regarding the use of pigments other than white lead and zinc white Sabin * states the following:

"The vast majority of houses in this country are painted with white-lead paint, either pure or (more commonly) adulterated with barytes (barium sulphate), terra alba (sulphate of lime), whiting (carbonate of lime), or other less important sophistications. Carbonate of barium is sometimes used instead of the sulphate. These barium compounds are the least objectionable, being in fact substances chemically inert and of stable composition; but they are practically without coloring power being nearly transparent in oil, and while they probably help to protect the wood they are really used only to cheapen the paint, and commonly to increase the profit to the maker or dealer; not at all for a benefit to the consumer."

In discussing zinc white he says, "White zinc is also an important and valuable white paint; zinc paint is harder than lead paint, and a mixture of zinc is therefore regarded by many as better than pure lead, especially for finishing coats. It is commonly thought to be of a purer white than white lead, and is largely used on interior work especially; when added to white lead it is usually in the proportion of one-third to two-thirds lead."

90 *Ana-ysis of White Leads.*

Station No.	Net weight.	White lead.	Zinc oxide.	Barium sulphate.	Calcium carbonate.	Sili a.	Clay.	Undetermined.
10 Globe White Lead...	13.5 oz.	9.98	12.00	76.28	.....	1.10	.....	0.64
11 Gold Seal White Lead Minnesota Linseed Oil & Paint Co., Minneapolis, Minn.	15.4 oz.	64.73	3.60	30.43	....	0.76	.....	0.48
12 Park White Lead... Park Lead Works.	14.8 oz.	4.69	12.50	75.72	5.89	0.67	....	0.53
24 American White Lead Premium Brand.	15. oz.	3.34	8.96	72.35	4.52	.....	10.83†	
37 Cartel White Lead... Carter Lead, Chicago, Ill.	31.5 oz.	99.28	. .	.....	.....	....	.....	0.72
52 White Lead..... Sample sent for analysis.	.....	54 69	17.38	27.57	....	.....	.....	0.36

† Silica and alumina calculated as clay.

No. 7. Gray Mixed Paints.
Minnesota Linseed Oil & Paint Co., Minneapolis, Minn.
Net weight—3 lbs., 8 oz.
Fluid portion contained approximately 10 per cent. naphtha.

*Technology of Paint and Varnish, page 311.

Pigment.	Per cent.
Lead calculated as white lead	57.72
Zinc oxide	28.32
Calcium carbonate	7.77
Color and undetermined	6.19
	100.00

No. 8. Ready Mixed Blue Paint.
Armstrong Paint Co., Chicago, Ill.

Net weight ..... 2 lbs., 14 oz.

Pigment.	Per cent.
Lead calculated as white lead	13.68
Zinc oxide	25.08
Calcium carbonate	34.93
Barium sulphate and color	26.31
	100.00

91 No. 9. Peoples' Prepared Paint.
Outside white, ready mixed for use. Manufacturer not given.

Net weight	13.5 oz.
Capacity of can	0.30 quart
Contents	0.23 quart

Fluid portion not pure linseed oil.

Pigment.	Per cent.
Lead calculated as white lead	2.27
Zinc oxide	44.44
Calcium carbonate	11.54
Gypsum	40.62
Silica, etc.	1.13
	100.00

No. 36. Prepared Gloss White for Outside Use.
The Sherwin Williams Co.
Guarantee.—"We guarantee that this paint when properly used, will not crack, flake or chalk off, and will cover more surface, work better, wear longer and permanently look better than other paints, including pure white lead and oil.
We hereby agree to forfeit the value of the paint and the cost of applying it, if in any instance it is not found as above represented."

Net weight	4 lbs., 2 oz.
Capacity of can	1.03 quart
Contents	0.98 quart
Pigment per cent. by weight	63.8
Fluid portion	36.2
	100.0

Fluid Portion.	Per cent.
Vegetable oil	93.5
Volatile oil	2.1
Water	4.4
	100.00

92

Pigment.	Per cent.
Lead calculated as white lead	44.52
Zinc oxide	47.91
Calcium carbonate	4.64
Silica	1.24
Alumina	0.78
Undetermined	0.91
	100.00

No. 38. Monarch Mixed Paint—Inside White.

Senour Manufacturing Co., Chicago, Ill.

Guarantee—the contents of this package is composed of linseed oil, turpentine, lead and zinc, and we guarantee it to be an absolutely pure paint, free from benzine, water or alkalies of any kind and to give satisfaction in every instance where directions are followed.

NOTICE.—This is not a chemical or patent paint. It is made of white lead, zinc and pure linseed oil and is therefore a body paint and requires to be rubbed out like lead and oil. One brushful will go as far or farther than two of other brands of mixed paints.

Net weight	14.2 oz.
Capacity of can	0.30 quart
Contents	0.24 quart
Pigments per cent. by weight	62.8
Fluid portion per cent. by weight	37.2
	100.0

Fluid Portion.	Per cent.
Vegetable oil	77.9
Volatile oil	22.1
Water	0.0
	100.00

Pigment.	Per cent.
Lead calculated as white lead	18.84
Zinc white	80.45
Undetermined	0.71
	100.00

93 No. 39. Patton's Sun-Proof Liquid Paint, Outside White.
Patton Paint Co., Milwaukee, Wis.
No guarantee given on label of can.

Net weight	3 lbs., 2 oz.
Capacity of can	1.02 quart
Contents	0.91 quart
Pigments per cent. by weight	62.2
Fluid portion per cent by weight	37.8
	100.0

Fluid Portion.	Per cent.
Vegetable oil	92.7
Volatile oil	7.0
Water	0.3
	100.00

Pigment.	Per cent.
Lead calculated as white lead	26.14
Zinc oxide	56.64
Calcium carbonate	3.19
Silica	13.10
Alumina	0.26
Undetermined	0.67
	100.00

No. 40. Gilt Edge House Paint, Inside White.
Farwell, Ozmun, Kirk & Co., St. Paul, Minn.
"Strictly Pure."
"Gilt Edge House Paints are composed of pure carbonate of lead, oxide of zinc, pure linseed oil and enough turpentine and Japan to insure correct drying and working qualities. Our outside white contains only lead and zinc for pigment, and is strictly pure. The light tints and other shades contain as coloring matter, the best oxides, ochres and chemically prepared colors to be obtained."
The inside white bears a special label, "Don't use for outside work."

	Net weight	3 lbs.
	Capacity of can	1.04 quart
	Contents	.99 quart
94	Pigments per cent. by weight	62.9
	Fluid portion	37.1
		100.0

Fluid Portion.	Per cent.
Vegetable oil (contains large amount of resin)	60.1
Volatile oil	39.9
Water	0.0
	100.00

Pigment.		Per cent.
White lead		0.00
Lead sulphate		2.57
Zinc oxide		65.81
Lithopone		30.79
Barium sulphate	20.20	
Zinc oxide	4.46	
Zinc sulphide	6.13	
Silica		0.28
Undetermined		0.55
		100.00

No. 41. "N. W." Mixed Paint—Outside White.
T. L. Blood & Co., St. Paul, Minn.
"Unexcelled for durability, fine finish and covering capacity."
"The pigment of the 'N. W.' paint is composed of carbonate of lead, oxide of zinc and colors, thinned with pure linseed oil and sufficient turpentine, Japan and spirits of turpentine to insure general working qualities. No other materials enter into its composition."
"When properly applied, we guarantee our 'N. W.' paint to give entire satisfaction as to durability, covering capacity and fine finish."

Net weight	3 lbs., 5 oz.
Capacity of can	1.03 quart
Contents	.89 quart
Pigment per cent. by weight	62.1
Fluid portion per cent. by weight	37.9
	100.0

95 Fluid Portion.	Per cent.
Vegetable oil	86.7
Volatile oil	10.5
Water	2.8
	100.00

Pigment.	Per cent.
Lead calculated as white lead	31.32
Zinc oxide	68.14
Undetermined	0.54
	100.00

No. 42. Cottage Colors—Outside White.
Bradley & Vrooman Co., Chicago, Ill.
"Unequalled for fineness and durability."
Guarantee.—We guarantee that when properly applied on a surface in the proper condition, Crown Cottage Colors, will give better satisfaction than any other paint (including white lead) and in all cases where it does not and it is the fault of the material used we will do the work over again at our expense.

Net weight	3 lbs., 3 oz.
Capacity can	1.05 quart
Contents	0.99 quart
Pigment per cent. by weight	63.0
Fluid portion per cent. by weight	37.0
	100.0

Fluid Portion.	Per cent.
Vegetable oil	92.8
Volatile oil	6.8
Water	0.4
	100.00

Pigment.	Per cent.
Lead calculated as white lead	25.66
Zinc oxide	54.25
Calcium carbonate	19.42
Undetermined	0.67
	100.00

96 No. 43. Best prepared Paint—Outside White.
Heath & Milligan Manufacturing Co., Chicago, Ill.
No guarantee given on label.

Net weight	4 lbs., 2 oz.
Capacity of can	1.06 quart
Contents	1.01 quart
Pigment per cent. by weight	63.57
Fluid per cent. by weight	36.43
	100.0

Fluid Portion.	Per cent.
Vegetable oil	89.55
Volatile oil (apparently not pure turpentine	9.70
Water	0.75
	100.00

Pigment.	Per cent.
Lead calculated as white lead	43.45
Zinc oxide	45.75
Calcium carbonate	10.39
Undetermined	0.41
	100.00

No. 48. Seroco Ready-Mixed Paint—Outside White.
Seroco Paint Mfg. Co., Chicago, Ill.
Obtained from Sears, Roebuck & Co., Chicago.
"We guarantee our paint to wear for five years if these directions (given on label) are carefully followed."

Net weight	3 lbs., 2 oz.
Capacity of can	1.01 quart
Contents	.96 quart
Pigments per cent. by weight	63.1
Fluid portion per cent. by weight	36.9
	100.0

Fluid Portion.	Per cent.
Vegetable oil	72.2
Volatile oil	3.8
Water	24.0
	100.00

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Pigment.	Per cent.
Lead calculated as white lead	13.85
Zinc oxide	34.88
Calcium carbonate	26.84
Barytes	23.10
Undertermined	1.33
	100.00

No. 49. Ruchter's Durable Paint for Building—Exterior, white, interior.
A. A. Eberson & Co., St. Louis-Baltimore.
No guarantee stated on label.

Net weight	4 lbs., 14 oz.
Capacity of can	1.06 quart
Contents	.97 quart
Pigments per cent	83.9
Fluid portion per cent.	16.1
	100.0

Pigment.	Per cent.
White lead	00.00
Zinc oxide	53.00
Calcium carbonate	45.90
Magnesium carbonate	1.01
Undetermined	0.09
	100.00

No. 53. Paint.
Sample sent for analysis.

Pigment.	Per cent.
White lead	18.00
Zinc oxide	35.79
Barium sulphate	41.99
Iron oxide	3.18
Undetermined	1.04
	100.00

No. 55. Noxall Fast Color Paint—Outside White.
Enterprise Paint Mfg. Co., Chicago, Ill.
98 Unequalled for Fineness and Durability.

No. 56. Perfecto Mixed Paint—Outside White.
Enterprise Paint Mfg. Co.
No statement or guarantee given on label.

	No. 55.	No. 56.
Net weight	3 lbs., 1 oz.	0 lbs., 11.3 oz.
Capacity of can	1.06 quart.	0.34 quart
Contents	.94 quart.	0.25 quart
Pigment weight per cent	58.9	59.8
Fluid portion weight per cent	41.1	40.2
		100.0

Fluid portion.	Per cent. No. 55.	Per cent. No. 56.
Volatile oil	55.0	52.00
Volatile oil	28.0	26.00
Water	17.0	22.00
	100.00	100.00

Pigment.	Per cent. No. 55.	Per cent. No. 56.
White lead	20.46	23.25
Lead sulphate	6.50	7.12
Zinc oxide	27.06	31.80
Calcium carbonate	29.23	28.44
Barium sulphate	13.64	9.18
Undetermined	3.11	.23
	100.00	100.00

No. 57. Favorite House Paint—Outside White.
John Masury & Son, New York and Chicago.
Label bears no guarantee.

Net weight	0 lbs., 14.3 oz.
Can capacity	0.27 quart
Contents	0.22 quart
Pigment weight per cent	54.3
Fluid portion	45.7
	100.00

99 Fluid Portion.

	Per cent.
Vegetable oil	97.9
Volatile oil	2.1
Water	0.0
	100.00

Pigment.	Per cent.
White lead	00.00
Lead sulphate	4.29
Zinc oxide	60.94
Barytes	33.32
Silica	1.18
Undetermined	0.27
	100.00

No. 59. Green Seal House Paint—Outside White.
Name of manufacturer not given.
Can bears no guarantee.

No. 60. Lion Brand Mixed Paint—Outside White.
St. Paul White Lead & Oil Co., St. Paul, Minn.
"For body this paint is unequalled. Its durability guaranteed."
"When properly applied, we guarantee Lion Brand paint to give satisfaction as to covering capacity, durability and finish."

	No. 59.	No. 60.
Net weight	3 lbs., 8 oz.	7 lbs., 0 oz.
Capacity of can	1.02 quart.	2.04 quart.
Contents	.95 quart.	1.94 quart.
Pigment per cent by weight	60.8	61.2
Fluid portion per cent by weight	39.2	38.8
	100.00	100.00

Fluid portion.	Per cent. No. 59.	Per cent. No. 60.
Vegetable oil	91.8	92.6
Volatile oil	4.9	4.1
Water	3.3	3.3
	100.00	100.00

100 Pigment.	Per cent. No. 59.	Per cent. No. 60.
White lead	21.53	20.65
Lead sulphate	8.03	7.76
Zinc oxide	39.13	41.27
Calcium carbonate	11.97	10.98
Barium sulphate	16.12	15.84
Silica and alumina (calculated as clay)	3.08	3.16
Undetermined	0.14	0.34
	100.00	100.00

Nos. 50 and 61 B. P. S. Paint—Outside Gloss White.
The Patterson, Sargent Co., Cleveland, Ohio.
Best Paint Sold.

	No. 50.	No. 61.
Net weight	14 oz.	3 lbs., 13 oz.
Capacity of can	0.30 quart.	1.06 quart.
Contents	0.23 quart.	.99 quart.
Pigment weight per cent	63.4	63.2
Fluid portion	36.6	36.8
	100.00	100.00

Vegetable oil	97.1	97.0
Volatile oil	2.0	2.0
Water	0.9	1.0
	100.00	100.00

Pigment.	Per cent.	
White lead	54.61	50.52
Lead sulphate	0.00	0.00
Zinc oxide	45.09	46.06
Silica	0.00	3.18
Undetermined	.30	0.24
	100.00	100.00

101 No. 62. Acme Household Paint—White.
Acme White Lead & Color Works, Detroit, Mich.

Net weight	14.9 oz.
Capacity of can	0.30 quart
Contents	0.26 quart
Pigment weight per cent	28.3
Fluid portion weight per cent	71.7
	100.00

Fluid Portion.	Per cent.
Vegetable oil containing a large amount of a dissolved resin	68.6
Volatile oil	30.0
Water	1.4
	100.00

Pigment.	Per cent.
Zinc oxide	99.80
Undetermined	0.20
	100.00

No. 63. Stearn's Paint—Outside White.
Made and guaranteed by Stearns Paint Mfg. Co., Davenport, Iowa.
We guarantee the Stearns Anchor Brand Paint to be made of the following material either carbonate of lead and zinc white, or such coloring and pigment as we deem necessary to produce desired shades, finely ground and tested raw linseed oil, turpentine and a very slight proportion of coach Japan and we hereby guarantee to pay $100 in gold in any case where the contrary can be proven.

Net weight	3 lbs., 15 oz.
Can	1.04 quart
Contents	.98 quart
Pigment weight per cent	63.8
Fluid portion weight	36.2
	100.00

Fluid Portion.	Per cent.
Vegetable oil	91.8
Volatile oil	5.4
Water	2.8
	100.00

102 Pigment.

	Per cent.
White lead	38.73
Lead sulphate	3.89
Zinc oxide	56.75
Undetermined	0.63
	100.00

No. 66. Tower Brand, Mixed Paint—Outside White.
Montgomery Ward & Co., Chicago, Ill.
Label bears no guarantee.

Net weight	3 lbs., 10 oz.
Capacity of can	1.3 quart
Contents	.95 quart
Pigment weight per cent	64.8
Fluid portion weight per cent	35.2
	100.00

Fluid Portion.

	Per cent.
Vegetable oil	84.5
Volatile oil	6.4
Water	9.1
	100.00

Pigment.

		Per cent.
Sublimed lead		80.28
Lead sulphate	59.09	
Lead oxide	16.01	
Zinc oxide	5.18	
Barium sulphate		19.08
Undetermined		0.64
		100.00

No. 67. Star Brand Mixed Paint—Outside White.
United States Paint Co., Chicago.
Sample bought from Montgomery, Ward & Co., Chicago.
Label bears no guarantee.

Net weight	3 lbs., 3 oz.
Capacity of can	1.05 quart
Contents	1.01 quart
Pigment weight per cent	55.4
Fluid portion weight per cent	44.6
	100.00

103 Fluid Portion.	Per cent.
Vegetable oil	64.5
Volatile oil	17.5
Water	18.0
	100.00

Pigment.	Per cent.
White lead	15.24
Lead sulphate	3.77
Zinc oxide	39.25
Barium sulphate	8.55
Calcium carbonate	28.45
Magnesium carbonate	3.15
Silica	.98
Undetermined	.61
	100.00

No. 71. House Paint—Outside White.*

Minnesota Linseed Oil & Paint Co., Minneapolis, Minn.

Strictly pure paint consisting only of pure carbonate of lead.

Pure oxide of zinc, pure tinting colors.

Carefully mixed and thoroughly ground in our own pure linseed oil, pure turpentine, and pure turpentine driers.

Put up in full measure and sold subject to chemical analysis.

Net weight	8 lbs., 2 oz.
Capacity of can	2.11 quarts
Contents	2.05 quarts
Pigment weight per cent	65.4
Fluid portion weight per cent	34.6
	100.00

Fluid Portion.	Per cent.
Vegetable oil	95.6
Volatile oil	4.4
Water	0.0
	100.00

*The manufacturers inform us that this is the only grade of paint now furnished to the trade by their house, and that the paint is to be made in strict conformity with North Dakota law.

104 Pigment.

	Per cent.
Lead calculated as white lead	43.47
Zinc oxide	56.09
Undetermined	0.44
	100.00

Con' nts and net weights of samples analyzed calculated to gallons and pounds per gallon.

Lab. No.		Quarts	Lbs. per gallon.
7	Minnesota Linseed Oil & Paint Co	....	14 lbs. 0 oz.
8	Armstrong Paint Co.	....	11 lbs. 8 oz.
9	Peoples' Paint. No manufacturer given	3.68	13 lbs. 8 oz.
36	Sherwin, Williams Co	3.92	16 lbs. 8 oz.
38	Senour Mfg. Co	3.84	14 lbs. 3 oz.
39	Patton Paint Co	3.64	12 lbs. 8 oz.
40	Farwell, Ozmun, Kirk Co	3.96	12 lbs. 0 oz.
41	T. L. Blood & Co	3.56	13 lbs. 4 oz.
42	Bradley & Vrooman Co	3.96	12 lbs. 12 oz.
43	Heath & Milligan Mfg. Co	4.04	16 lbs. 8 oz.
48	Seroco Paint Mfg. Co	3.84	12 lbs. 8 oz.
49	A. A. Eberson & Co	3.88	19 lbs. 8 oz.
55	Enterprise Paint Mfg. Co	3.76	12 lbs. 4 oz.
56	Enterprise Paint Mfg. Co	4.00	11 lbs. 5 oz.
57	John W. Masury & Son	3.52	14 lbs. 5 oz.
59	Green Seal, Manufacturer not given	3.80	14 lbs. 0 oz.
60	St. Paul White Lead Oil Co	3.88	14 lbs. 0 oz.
61	Patterson, Sargent Co	3.96	15 lbs. 4 oz.
62	Acme White Lead & Color Works	4.16	14 lbs. 14 oz.
63	Stearn's Paint Mfg. Co	3.92	15 lbs. 12 oz.
66	Montgomery Ward & Co	3.80	14 lbs. 8 oz.
67	United States Paint Co	4.04	12 lbs. 12 oz.
71	Minnesota Linseed Oil, Paint Co	4.10	16 lbs. 4 oz.

105 Thereupon afterwards, to-wit: on the 5th day of January, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 7 of the Journal of this Court, for the Southeastern Division:

(500.)

"HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The motion of the complainants for a preliminary injunction coming on for hearing before the Court at this time, H. L. Stern, Sigmund Zeisler and Spalding & Stambaugh appearing in support of

said motion, and R. M. Stevens, Assistant Attorney General of North Dakota and Ball, Watson and Maclay opposed, and the arguments not being completed at the hour of adjournment, the hearing is continued to tomorrow morning.

Thereupon afterwards, to-wit: on the 6th day of January, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 8 of the Journal of this Court, for the Southeastern Division:

(500.)

"HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Come now the parties by — respective counsel, and the hearing on the motion for a preliminary injunction is resumed before the Court.
Now it is ordered that the further hearing on said motion be continued until after the taking of the evidence in support of
106 certain allegations in the bill of complaint."

Thereupon afterwards, to-wit: on the 8th day of January, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 10 of the Journal of this Court for the Southeastern Division:

(500.)

"HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

This cause having come on to be heard on the motion of complainants for a preliminary injunction to restrain the defendant as prayed in the bill of complaint, which motion was heard on the verified bill of complaint and the affidavit of E. F. Ladd, filed on behalf of the defendant on opposition to said motion, and the Court having heard the arguments of counsel,

It is ordered: That said motion be and the same is hereby continued for disposition until after the taking of the evidence hereinbefore provided for and that until such disposition the temporary restraining order heretofore made in this cause remain in full force and effect.

It is further ordered: That the subject matter embraced in the allegations of subparagraphs (*a*) and (*b*) of the paragraph numbered 17 of said bill of complaint be and the same is hereby referred to Mrs. Jessie S. Conover, who is hereby appointed special master of this Court for that purpose, to take evidence thereon and report the same to this Court with all convenient speed.

It is further ordered: That complainants shall close their proofs under this reference by the 26th day of January, 1906, and that the defendant shall close his proofs under this reference by the 10th day of February, 1906, and that the complainants shall have the week following within which to introduce evidence in re-
107 buttal.

It is further ordered: That the number of witnesses to be examined shall be limited to three to be called by the complainants and three to be called by the defendant. It is further ordered, if the parties herein so stipulate, that the testimony of any witness may be taken by deposition before any person authorized to administer oaths at any place other than Fargo, North Dakota, which counsel for the respective parties may agree upon by written stipulation and upon such notice and such other conditions as may be fixed in such stipulation.

It is further ordered: That the testimony to be taken as aforesaid shall embrace not only the allegations of said subparagraph- (*a*) and (*b*), but also the question whether the ingredients named in said paragraphs have, in the preparation of mixed paints, been more commonly used for purposes of adulteration or fraud or by that inherent properties are more susceptible of use for that purpose than carbonate of lead and oxide of zinc, and any other fact which would be a cause for placing, for the purpose of mixed paints, the ingredients mentioned in said paragraphs in a different class from those mentioned in the statute of North Dakota involved in this suit."

Thereupon afterwards, to-wit: on the 8th day of February, A. D. 1906, Order was filed in this cause, which Order is in words and figures following, to-wit:

"United States Circuit Court, District of North Dakota, Southeastern Division.

"HEATH & MILLIGAN COMPANY ET AL., Complainants,
vs.
J. H. WORST, Defendant.

Upon application of counsel for the respective parties,

It is ordered: That the application of the complainant- for a preliminary injunction be and the same is hereby set down for argument at the Federal Building in the City of Fargo, in this District, on the 23d day of February at ten o'clock in the fore-
108 noon of that day, or as soon thereafter as counsel can be heard.

Dated Fargo, N. D. February 8, 1906.

CHARLES F. AMIDON, *Judge.*"

Upon the back of said Order appear endorsements in words and figures following, to-wit:

"# 500. Filed Feb. 8, 1906, J. A. Montgomery, Clerk."

Thereupon afterwards, to-wit: on the 21st day of February, A. D. 1906, Testimony was filed in this cause, which Testimony is in words and figures following, to-wit:

109 It appearing from a telegram from Mrs. Jessie S. Conover that she is delayed on her way to Chicago, and it being desired to proceed with the taking of testimony under the order of reference as heretofore stipulated, at 10:00 o'clock A. M. this day, it is hereby stipulated that until the arrival of Mrs. Conover the witnesses may be sworn by Robert H. Atkinson, a Notary Public, and that their testimony may be taken in shorthand and thereupon transcribed by said Atkinson, and that the transcript of the testimony of witnesses so taken shall be received and given the same force and effect as though the testimony were taken before Mrs. Conover as Special Master in Chancery; the signatures of all witnesses to *be* transcript of the testimony, both that taken before the Notary Public as well as that to be taken before said Special Master, is hereby waived.

Chicago, Jan. 22d, 1906, 10 A. M.

(Signed) SIGMUND ZEISLER,
HENRY L. STEIN,
Solicitors of Complainants.

Filed Feb. 21, 1906.

J. A. MONTGOMERY, *Clerk.*

110 Mr. CHARLES BENJAMIN DUDLEY, a witness called on behalf of the complainants, being first duly sworn on oath, testifies as follows:

Direct examination.

By Mr. ZEISLER:

Q. State your full name?
A. Charles Benjamin Dudley.
Q. Where do you reside?
A. At Altoona, Pennsylvania.
Q. How old are you?
A. Sixty-three years old last birthday.
Q. What is your business?
A. I am Chemist of the Pennsylvania Railroad.
Q. How long have you been in that position?
A. Thirty years the 10th of last November.
Q. Are you a graduate of any University?
A. I graduated as Bachelor of Arts at Yale University in 1871 and as Doctor of Philosophy in the Sheffield Scientific School of Yale University in 1874.
Q. What particular studies are those that resulted in your degree of Doctor of Philosophy?
A. Principally chemistry, but general science likewise.
Q. Is there such a position as Chief Chemist of the Pennsylvania Railroad System?
A. There is.

Q. Who occupies it?

A. I do.

Q. How many assistants are there under you in your department?

A. Twelve.

111 Q. Are you or have you been a member or officer of any learned societies or of the society for testing materials?

A. I was for two years—I have been a member of the American Chemists Society for a number of years, and for two years its President. I also—I don't know how completely you want this.

Q. Give *is* all that comes under that subject?

A. I am a member of the Iron and Steel Institute of Great Britain; of the London Chemical Society; of the Société Chemique of Paris; also of the German Chemical Society—Verein Deutscher Chemiker. And also a member of the American Society for testing materials.

Q. How long have you been a member of that society?

A. For about five years, and am at present its President.

Q. In your capacity as chief chemist for the Pennsylvania Railroad System, have you had to do with testing, specifying for and analyzing paints?

A. I have.

Q. Have you ever been a manufacturer of paints?

A. I have not.

Q. Has the Pennsylvania Railroad System ever manufactured its own paints?

A. Not to my knowledge.

Q. Not during the time that you have been its chemist?

A. No sir.

Q. Is the Pennsylvania Railroad System a consumer and a user of paints?

A. To a very large extent.

Q. Can you give us an idea of how large?

A. Approximately the amount of money spent for paint
112 material, including oils, Japans, varnishes, surfacers and paints more directly or positively so called, amounts to nearly a million dollars a year.

Q. Who directs the kind of paint that should be purchased for use by your railroad or who approves of paint purchased?

A. The practice is not uniform. For a portion of the paint we have definite printed specifications and for these the purchases are made in accordance with those specifications and every shipment examined in the laboratory before it is used.

Q. And who has made those specifications?

A. I have. I might possibly add a little bit to my previous answer. A portion of the paints are bought on the reputation of the makers, the time and attention that we have been able to give to this subject not being sufficient to comprehend the whole problem yet.

Q. In the case of paints which you buy on the reputation of the maker, is there an analysis made at all of the paint at one stage or another?

A. Not uniformly, but frequently for information.

Q. How much of this total money that you annually spend or expend for paints and other surface coverings mentioned by you is made up of mixed paints, approximately?

A. It would be difficult for me to say, but possibly a quarter and may be a third. I could not say positively closer than that.

113 Q. You have made, have you not, Doctor, analyses of many kinds of mixed paints in the course of this thirty years of service for the railroad company?

A. Personally I am not able to make any analyses myself, but there have been made in my laboratory, under my supervision, quite a large number of examinations and analyses of mixed paints of the makers.

Q. Have there been made under your supervision and to some extent under your observation physical tests as to the wearing quality and other qualities of mixed paints?

A. The paints that we have mixed ourselves for experiment, yes sir.

Q. Not the mixed paints that you have purchased ready made?

A. Not usually.

Q. Have your analyses, and I include those made under your supervision or observation—your observation and superintendence, and the tests made in your department and the actual experiments in the use of paints on cars and buildings and other portions of the body of your railroad enabled you to form a judgment as to the value of various pigments used in mixed paint?

A. I think it has.

Q. Name some of the different kinds and classes of surfaces which are painted in the work of your railroad?

A. Freight cars, passenger cars, all buildings along the track, water stations, fences, bridges.

Q. When you speak of buildings, do you include engine houses?

A. Not so much engine houses as stations—station houses
114 more particularly.

Q. So that we may understand by the use of the fewest words possible what we mean, I propose hereafter in this examination to refer to carbonate of lead and oxide of zinc as the "statutory pigments" because they are the only white pigments specified in the North Dakota Statute. I will refer to sublimed white lead, zinc lead white, zinc from western ores carrying a percentage, a varying percentage of sulphate of lead or oxy-sulphate of lead and lithopone as "Class A pigments," that being those mentioned in sub-paragraph (*a*) of paragraph 17 of the bill of complaint in this case, and I will refer to sulphate of barium, silica, silicate of magnesia, calcium carbonate and hydrated sulphate of lime, being the pigments specifically mentioned in sub-paragraph (*b*) of paragraph 17 of the bill as "Class B pigments." I will now ask you, Doctor, to state your opinion of the value of the statutory pigments and wherein they fall short of being perfect pigments?

A. Our studies on white pigments have led us to the general con-

clusion in brief that both white lead and zinc white are distinctly inferior pigments. The unfortunate phase of the case has been that we did not know until recently of any better and were therefore compelled to use them. In detail, white lead is an easily decomposable body, not stable. Mixed with linseed oil, apparently chemical reaction takes place which results in a rapid perishing of the paint, well known as powdering or flouring. Also the pigment is
115 readily acted upon by the gases arising from the burning of coal or in the air from sewers, and is discolored thereby. Also in our studies, from some cause, probably the presence of finely uncorroded metallic lead, a surface painted with white lead becomes yellowish. These statements should be taken as apparently based on observations; for the absolute chemistry of the changes that give the results I do not think has been worked out yet. The results are patent. Zinc white——

Q. When you speak of zinc white do you refer to oxide of zinc?

A. Yes sir.

Q. And when you refer to white lead do you refer to commercial carbonate of lead?

A. Yes sir, the statutory carbonate of lead is described. Zinc white apparently combines likewise with linseed oil when applied as a paint, forming a layer which has a great tendency to crack and peel off and also does not stand well outside exposure. That covers the most that I care to say.

Q. Describe the evolutionary process by which you reached the conclusion, if you have,—that some other pigment is better than the statutory pigments or that the defects of the statutory pigments which you have described can be remedied by the addition of some other pigment?

A. Paint, as we understand it, is a mixture of finely divided matter with, for the purposes, linseed oil. I exclude all other substances that may be used for the moment to give you some idea. If the finely divided matter is of such a nature that it can, by
116 chemical change, combine with the linseed oil, usually in our experience a product is formed that is not as durable and valuable as though the finely divided matter which we commonly call pigment was absolutely inert to linseed oil. Now, the first basis for a complaint against the statutory pigments is that they easily result in such chemical reaction with constituents of the oil. The same principle, namely, inertness to chemical change, has led us to look for any other pigments that might be found in the realm of nature that were inert upon linseed oil to take the place of the statutory pigments. And as I said at the outset, the statutory pigments, in accordance with our studies, are inherently defective and bad.

Q. How did you overcome the inherent defects of the statutory pigments, or what conclusion have you arrived at as to the manner in which those defects can be overcome or partly overcome?

A. I know of no method by which the defects of the statutory pigments may be absolutely overcome. Their defects may be diminished or minimized in two or three ways; first, abandoning them entirely

and using others; second, mixing with the statutory pigments other pigments which do not have the defects mentioned and thus obtain a paint layer which will be less subject to the defects that have been already stated.

Q. I understood you to say that carbonate of lead standing alone has those inherent defects described by you and that oxide of
117 zinc standing alone has its inherent defects which you have spoken of. Are these defects lessened by a combination between carbonate of lead and oxide of zinc?

A. In the same paint?

Q. In the same paint?

A. Yes sir.

Q. Are they lessened?

A. I can not point to a positive experiment on that point in that regard, but in general as the results of observation and practice, I would say a more valuable paint would be obtained by a mixture than to use either one alone.

Q. Now, then, speaking of the combination between the two, is the combination still subject, though in lessened degree, to the defects which you have spoken of?

A. I do not have in mind any specific case, but I should say yes, to a greater or less extent.

Q. Have you found it necessary to add to a combination of carbonate of lead and oxide of zinc some other pigment in order to over come, at least in part the defects to which the combination between the carbonate of lead and oxide of zinc is subject?

A. We have found it extremely desirable to mix a third pigment with the combination of the statutory pigments.

Q. Desirable in what direction?

A. As giving longer life to the paint layer particles.

Q. Have you found it possible to add a third pigment of
118 perhaps a combination of third pigments to a combination of carbonate of lead and oxide of zinc whereby on the one hand the wearing qualities of the paint is considerably enhanced without at the same time detracting from the other useful qualities possessed by a combination of only carbonate of lead and oxide of zinc?

A. I think I may safely say yes.

Q. Will you name one or more of such additional pigments?

A. A combination of the statutory pigments with barytes with silica, with gypsum.

Q. Silicate of magnesia?

A. I have not so much experience with that; but an addition of gypsum likewise would, in our judgment and experience, make a better paint than the statutory pigments alone and would not cause difficuly either in covering or spreading or working, or in any other way, so far as we know, detract from the value of the paint layer.

Q. Did you say that one of these pigments just mentioned by you, the class B pigments, added to carbonate of lead and oxide of zinc, would have that effect, or would you say that it is necessary to add more than one of the class B pigments?

A. We know of no reason why either one alone or a combination of the class B pigments cannot be used with statutory pigments.

Q. What is the quality possessed by these class B pigments which you have mentioned, which gives them the value that you have spoken of?

A. Largely, it seems to me, inertness to chemical change,
119 they being permanent chemical bodies which do not readily lend themselves to combinations with any of the constituents of the oil.

Q. What would you say as to the influence of gases and atmospheric conditions upon the class B pigments?

A. They are likewise more inert towards gas and atmospheric conditions, and consequently the paint layer contains, therefore, a percentage of material which does not change readily.

Q. State whether or not it is an important quality of mixed paint that after it has been on the surface for a time and it is desired to repaint the surface, the surface should be in proper condition for repainting or painting over?

A. It is a very important quality.

Q. State whether or not in this regard mixed paints containing only the statutory pigments are lacking and whether by the addition of a third pigment that quality can be enhanced?

A. With white lead, the usual condition of the surface on exposure—carbonate of lead, one of the statutory pigments, the usual condition of the surface on exposure is that it becomes porous and easily detachable. On painting over this, a large part of the vehicle used in the paint goes into the porous layer, making it difficult to get an even surface in repainting. With zinc white the tendency to crack and peel as well, leaves a bad surface. With a combination, these two qualities may be diminished somewhat, but even then the presence of a third inert pigment, as already men-
120 tioned, does leave a smoother, better surface to which to apply the repainting then if the third pigment was not there, in our judgment.

Q. How large a percentage of inert pigment of class B might safely be contained in a mixture with the statutory pigments, without appreciably detracting from any of the useful qualities of a combination of the statutory pigments?

A. Our experience clearly indicates that a mixture of equal weights of each of the statutory pigments, of the two statutory pigments, with the same, the equal weight of the third, with either of the class B pigments, with the possible exception of carbonate of lime, which we have not experimented with so much, will give a perfectly satisfactory paint.

Q. Do I understand you to say then that a mixture containing one-third carbonate of lead, one-third oxide of zinc and one-third of one or more of the class B pigments would make a highly satisfactory mixed paint?

A. I think so, yes sir.

Q. Provided, of course, the necessary thinner is added?

A. Oh, everything else must be first class. I am assuming that in all my testimony.

Q. How long is it since you have been using inert pigments as a part of the composition of your mixed paints?

A. It is a little difficult for me to say positively, but for at least fifteen years and possibly twenty. If I had known that question would have come, I would have looked up our first specifi-

121 cation.

Q. That is near enough. In the specification which you have prepared as the result of your chemical knowledge and your tests and practical experiments, have you required the addition of a third pigment to the statutory pigments?

A. We have not yet made a specification in which the statutory pigments are necessarily involved. The specification which we have are our freight car color, which is red, passenger car color which is likewise tuscan red—what we call an olive color, iron color, which is a dark olive—and a way car which is likewise a red. The studies leading to a specification in which the statutory pigments are involved is in hand but has not yet been issued. The specification has not yet been issued.

Q. In those specifications which you have mentioned and which you have worked out, are any of the pigments of class B specified?

A. They are specified by permission. The characteristic specification in the freight car color, the characteristic material is definitely specified in amount, and the balance of the pigment may be of any one of the class B pigments except barytes and carbonate of lime, the first being excluded on account of cost and the second because we only allow a limited amount of easily decomposible carbonate.

Q. When you speak of the cost of barytes, do you mean the high cost or the low cost?

A. I mean the high cost compared with the other inert ma-

122 terials. We have no objection to barytes as a constituent of paints provided the same number of gallons of paint are sold to us for the same money.

Q. Now, about paints other than the limited class regarding which you have formulated specifications, do you examine the paints to find out what constituents they contain?

A. Yes sir, frequently.

Q. And which class do you prefer, those which contain a third pigment or those which do not contain a pigment of class B?

A. Provided the material is sold on its merit we prefer the paints containing a pigment of class B. I might explain that if a dealer should agree to sell us at a price a material containing only the statutory pigments and it should be found that it contained class B pigments, we would regard that as a fraud and object to it. On the other hand if we get a material at a proper price such as we would prefer, it would be a mixture of the statutory pigments, if they are the ones involved, with a third pigment of class B.

Q. What percentage of class B pigment is specified in standard freight car color?

A. The essential requisites of that specification are not less than

twenty (20) per cent of oxide of iron, our characteristic shade; between two (2) and five (5) per cent of carbonate of lime; the balance may be any one of the class B pigments except barytes, for reasons already mentioned.

Q. In a mixed paint sold by the gallon the question of the cost of the barytes would not enter, would it?

123 A. I hardly know how you mean that question. It would cost the manufacturer more to make a gallon of mixed paint using barytes, than it would to make the same gallon of mixed paint with the same amount of inert pigment present if he used the sulphate of lime.

Q. At the same price, as between two gallons of paint, one containing barytes and the other containing another class B pigment, which would you prefer, or would you have any preference?

A. Now, do you mean the same amount of statutory pigments and some other inert material?

Q. Yes?

A. Yes, it would be immaterial to me at the same price whether the same percentage of barytes or of some other class B pigment, except carbonate of lime, which I can bring out later, if you want, were present. In other words, I have absolutely no objection whatever to barytes when it is used in proper amount. It is perfectly stable, durable, unchangeable chemical body and as such absolutely ideal for the preservation of surfaces.

Q. Carbonate of lime is the same as carbonate of calcium, is it not?

A. Yes, sir.

Q. Now, there are quite a number of articles, are there not, which are chemically calcium carbonate but which differ in their physical properties?

A. I think so.

Q. Is white mineral primer what is chemically known as calcium carbonate?

A. I so understand. I have not examined it myself.

124 Q. You have no acquaintance with white mineral primer?

A. Not under that name, no sir.

Q. When you speak of calcium carbonate or carbonate of lime, do you refer to whiting particularly?

A. The material may occur in the market in several forms. Whiting is one of the forms which is common. It is also prepared artificially by pulverizing chalk, I understand. I am not so sure about that, not having looked it up. It is also on the market in the form of a precipitate, having been obtained as a precipitate in a chemical way; and also in the form of ground marble, pulverized marble. Essentially they are necessarily the same, most of those substances. They may contain more or less impurities.

Q. Physically they are not the same, are they?

A. No sir, the precipitate material is finer and usually, from our experience, whiter.

Q. Assuming now a mixed paint requiring the presence of white pigments containing a high degree of opacity, and assuming for that

purpose the presence in the paint of carbonate of lead and oxide of zinc, will you please make a comparison as between the qualities of a paint which would contain only the statutory pigments and the quality of a paint which in addition to the statutory pigments would contain a third pigment, say for instance barytes. Is my question clear?

A. I think *do*, except I don't know in what respect you want the comparison.

Q. Comparison of the qualities, generally, which would you
125 prefer and why?

A. I would prefer the one containing the barytes, as the question is stated, barytes in proper amount, as the question is stated, because, principally, of a greater durability of such a paint layer.

Q. Can you estimate within certain limits the increase and durability?

A. I have no positive experiments, but I would expect at least a fifteen (15) per cent. or twenty (20) per cent. increase in life.

Q. And this increase you would attribute to the presence of barytes, would you?

A. I would.

Q. I find in bulletin number 67, given out by the North Dakota Agricultural College, Government Agricultural Experiment Station which is attached as an exhibit to an affidavit by Professor Ladd, filed in this case, the following language used to describe the qualities of sublimed white lead, which I will read to you: "This product is so named because it is prepared by a sublimation process. The product is obtained directly as a very fine, impalpable, white powder, without grinding. Chemically it is very different from ordinary white lead, being apparently a basic sulphate of lead and, as prepared by the Picher Lead Company of Joplin, Missouri, has approximately the following constitution:

Lead sulphate	75 per cent.
Lead oxide	20 per cent.
Zinc oxide	5 per cent.

The lead oxide is present not as the yellow litharge but apparently as a white oxy-sulphate. Its presence has been found to
126 greatly increase the body of the paint, making it entirely different physically from ordinary lead sulphate. The zinc oxide is incidental to the manufacture. The specific gravity of sublimed white lead is 6.2, approximately that of ordinary white lead. It exceeds in the fineness of the particles the ordinary grade of white leads and is, at least, equal to them in whiteness, body, covering power and wearing qualities. It differs from the ordinary white leads in being non-poisonous, and resists the blackening action of the sulphur compounds of sewer gas and of fuel gases to a much greater degree." Tell us, Doctor, whether you agree with this estimate of the quality of sublimed white lead?

A. I see nothing whatever to criticise, sir. I would accept those statements.

Q. Does this statement as to sublimed white lead embody your views on this pigment?

A. With the single exception that I would expect greater life as a pigment or in a paint made with this material than I would in one made from white lead. I think the words are "equal at least?"

Q. "At least equal."

A. Yes sir, I would expect greater life. Longer life would perhaps be better.

Q. Would you give your reasons why you so believe?

A. Because from its composition, this sublimed white lead is a less easily decomposible chemical body, more stable.

Q. In other words, it is more inert?

A. More inert towards the constituents of linseed oil.

127 Q. It is rather inert, is it not?

A. I expect so.

Q. The lead sulphate which is shown in the analysis is that really what would chemically be called lead sulphate or is it oxysulphate of lead?

A. Well, I think as the analysis is given it is lead sulphate. The excess of lead over what is essential to combine with the sulphuric acid is given in the analysis as lead oxide.

Q. Then in the form in which lead sulphate is found in sublimed white lead it has a higher degree of inertness, has it, compared with carbonate of lead?

A. Yes, I would say so. It perhaps ought to be stated that I would not like to be positive as to exactly of what constitution sublimed lead is, whether it is lead sulphate with the excess of lead chemically combined or not. I am not satisfied in my mind as to exactly how the excess of lead exists, but the compound I would expect to be a more stable body than white lead.

Q. And inasmuch as it is equal to carbonate of lead in whiteness and covering power, therefore you would regard it as preferable to carbonate of lead?

A. I would.

Q. In your analyses of mixed paints purchased for the Pennsylvania Railroad Company, have you found sublimed white lead?

A. We have.

Q. And your company has used mixed paints containing sublimed white lead?

A. We have.

Q. Has there ever been any complaint of that paint?

A. Not to my knowledge.

128 Q. State whether or not you would regard a combination between oxide of zinc and lead sulphate or oxy-sulphate of lead as superior to a combination between oxide of zinc and carbonate of lead?

A. I have no positive experience with that particular combination, but speaking as a chemist I would expect it to be more valuable.

Q. Which would be more valuable?

A. The combination of oxy-sulphate of lead with zinc white.

Q. Please state whether or not there are mixed paints which can

not be manufactured except by using class B pigments, one or more of them?

A. I do not know that I could give you a positive answer to that, that being a manufacturing feature. However, it is a principle, as I understand it, that those things should be mixed together in pigments where there is no possible chemical reaction between the constituents, and I believe it is common knowledge that certain of the blends mixed with white lead undergo a chemical change even before the paint is spread on the surface. This is not in my own experience, however.

Q. You speak of that matter from your own knowledge as a chemist?

A. Yes sir.

Q. Now, then, so far as the coloring effect of the pigment, the statutory pigments is concerned, and the coloring effect of the opaque substitutes for the statutory pigments is concerned, are there not colors of mixed paint which could not be produced, if some one or another or a combination of these opaque pigments were

129 added, by reason of the modification that they would work in the color?

A. Our studies indicate that no substance containing coloring power, including whites, can be added to any tint or tinting material without changing the shade, and while I have not personal experience in the manufacture, not being a manufacturer, it is commonly understood that some of the greens can not be made and get the shade desired, if you use the statutory pigments.

Q. Would your answer be the same, if you were asked if opaque pigments in class A could be added—in other words would the coloring strength of a class A pigment likewise forbid its use in the same way that the statutory pigments would be forbidden, if it were desired to produce a certain shade of green for instance?

A. So far as our knowledge goes, and it is the result of a good deal of experiment, the addition of any pigment containing or having inherent coloring power, including whites of any kind, to the other tinting material, would change the shade.

Q. Would that lead you to conclude that the statutory pigments and the class A pigments could not be used at all in certain shades desired to be produced?

A. As I said before, I have not positive knowledge on this subject by making experiments, but I would expect that to be the case.

Q. If then, in order to give to the mixed paint the neces-

130 sary consistency, you have got to add body to the paint, what pigment would you use?

A. Any one of the class A pigments that is applicable.

Q. Class A?

A. Class B pigments, I mean to say, any one of the class B pigments that is applicable to the situation.

Q. Would there be any other pigment than one of class B pigments that could be used to give body and consistency to the mixed paint under such circumstances?

A. I know of none.

Q. State whether or not it is a defect in mixed paint if the solid matter in it settles in the can, and whether it is a virtue of mixed paint if the pigments are kept in suspension?

A. It is a defect and it is a virtue, both. That is, it is a defect, if it settles, and a virtue if it remains suspended.

Q. What are the qualities of the statutory pigments if they alone are used in mixed paint, with reference to this subject?

A. Our experience is they settle badly.

Q. In order to keep the pigment in suspension in the can, what do you regard as desirable?

A. Anything that will not corrode the paint is desirable, and for that purpose some of the class B pigments seem to have quite virtues.

Q. You have told us about the influence of atmospheric conditions upon paint. Please direct your attention for a moment to in-
fluences upon paint arising from physical contact? for in-
131 stance in the case of floor paints—what is the comparative value there of a mixed paint made up only of statutory pigments and a paint which contains a class B pigment?

A. I do not know that I can point to an exact experiment on that subject, but I would expect that a paint with a class B pigment present would wear infinitely longer than a paint made only of the statutory pigments—I will say much longer.

Q. And for what reason, Doctor?

A. For the reason that the statutory pigments, owing to their readiness of chemical change apparently enter into combination with the oil and thus disintegrate more readily. The combination of an absolute inert pigment with linseed oil dried *in* a very good wearing substance. The combination of linseed oil with the statutory pigments that has had the necessary treatment with water and cleaning such as is necessary of floor paints, would be more porous and more inclined to go to pieces, as we would say, than the former.

Q. Would they be very easily rubbed off by the continual contact with the shoes of persons walking the room? Is that right?

A. That is right.

Cross-examination.

By Mr. WATSON:

Q. Doctor, what proportion of the million dollars expended an-
nually by the Pennsylvania Railroad Company is used in the
132 purchase of so called mixed paints?

A. I have already stated that I could not give that figure.

Q. About one-third?

A. A quarter to a third. I ought to explain, perhaps, that the bulk of the paints are bought in paste form. We are going into mixed paints more and more as we proceed.

Q. Of this proportion, running, as you think, from one-fourth to one-third, is paint which has been prepared by the manufacturer ready for use, is it? And you purchase it in that form?

A. Yes sir.

Q. For what classes of objects is this mixed paint ordinarily purchased by your company, for use on buildings or what class of work?

A. Both on cars and on buildings. We use very large amounts of protective coatings, so called, on steel cars. They are mixed paint as prepared by the manufacturer.

Q. Now, these mixed paints which you buy you say are ordinarily analyzed by your department before they are used?

A. No sir, not universally. Having no specifications for mixed paint we do not examine except for information.

Q. Then such of these mixed paints as you buy and pay for and use, without chemical analysis by your department, are purchased upon the reputation of the paint manufacturer who prepared them?

A. Largely so.

Q. What colors predominate in the mixed paints which you thus purchase already prepared for use?

A. The protective coatings are black. The building paints are two shades of drab; I think we may say a light drab and a
133 dark drab, and we may use for bridge paints a black or red. Other colors may be used, but not so much.

Q. Now, in purchasing these mixed or prepared paints for the purposes which you have mentioned, do you specify to the manufacturer what the ingredients shall be and in what proportions?

A. We have not as yet. We have not as yet.

Q. All these mixed paints which you purchase might come under some trade name or designation?

A. They may come under a special trade name or they may be called standard building color.

Q. In what sized cases are these mixed paints put up which you buy?

Q. The protective coatings usually in barrels. Mixed paints for that purpose may be in cans or in kegs or in various sized packages.

Q. Is the great bulk of the mixed paint which you buy contained in barrels?

A. I do not believe I will be able to say positively on that.

Q. What proportion, if any, of the mixed paints which you purchase, are contained in cans containing as small a quantity as a gallon?

A. That would be pretty difficult for me to answer. I am not so familiar with the detail of the handling of the goods in the storehouses and the like of that. Samples come to me for examination and such are usually taken out of the package and it is only general knowledge that I have on that subject.

134 Q. Well, it would be true, however, Doctor, that the great bulk of the prepared mixed paint that your company buys comes to your company in large packages?

A. I would say larger than gallon packages, usually, yes sir.

Q. And therefore is not put up in the class of containers which is used ordinarily in the retail trade of mixed paint—that would be true would it not?

A. I would expect that, although I could not say positively.

Q. Will you tell us, Dr. Dudley, from what one of the complainants in this case the Pennsylvania Railroad Company purchases mixed paints?

A. I shall have to have the list, if you will excuse me. It will be understood that I am not in the purchasing department nor in the storehouse department and therefore this knowledge would only come to me as the samples come for examination. I would not necessarily know where the material comes from of this kind, except as it comes to me as a sample. We have examined mixed paints from Devoe and Raynolds Company.

Q. I only asked you to name such of the complainants as your company has purchased and is in the habit of purchasing mixed paints from.

A. Then I don't believe I can answer.

Q. Then to your own knowledge you can not say that any of this one-third or one-fourth of a million dollars worth of mixed paint used annually by your company has been or is being purchased from any of the complainants in this case?

135 A. No sir, I can not say that.

Q. As I understand you, Dr. Dudley, one of your objections to a mixed paint in which only the statutory pigments are employed, is that it is acted upon injuriously by gas and becomes discolored. That is correct, is it?

A. Yes sir.

Q. Now, your observation and your experience and the conclusions at which you have arrived, are based pretty largely upon the use of paint by the Pennsylvania Railroad Company?

A. Yes sir.

Q. And of course the cars and the buildings of that company are situated close to the line of railroad or are upon the line of railroad, in use upon the road, are they not?

A. They are.

Q. Almost entirely?

A. Yes sir.

Q. And in their use of course the locomotives using coal I suppose as fuel, are constantly passing and repassing the buildings and cars?

A. They are.

Q. And I suppose in the coal which is used for the generation of steam a good many gases are emitted, sulphurious gases, with the smoke? That is true, is it not?

A. Yes sir, it is true.

Q. And these are the gases then that in your opinion have such an injurious effect upon the statutory pigments, discoloring them and causing them to turn yellow?

A. Not necessarily.

Q. But still it does have that effect, *and* you have already

136 testified?

A. Well, excuse me. The gas from the smoke stack of a locomotive, so far as sulphur is concerned, we believe to be largely sulphuric acid. The gas that is most injurious to white lead pigment is sulphurated hydrogen or hydrogen sulphide. And I am not

able to say to you that a smoke stack of a locomotive throws out any hydrogen sulphide.

Q. That would depend, I suppose, on the characteristic of the coal that was used as fuel, would it?

A. I can not tell you that.

Q. Now, what is the pigment, the use of which in your experience has more nearly obviated this defect, as you call it, in the statutory pigment in the matter of discoloration where the paint is exposed to gas?

A. I do not know that I could say to you that any pigment is the one which is less defective, except to say in a general way that any pigment which does not combine readily with sulphurated hydrogen and form a black compound would not have this discoloration due to sulphurated hydrogen. Any of the inert pigments mixed with iron, if you choose, or any of the class B pigments, so far as I know, with the possible exception of carbonate of lime, would not be acted upon by the sulphurated hydrogen.

Q. Do you consider that the presence of sublimed lead mixed with the statutory pigments is desirable when the building covered or where the surface covered with paint is exposed to gas such as comes from the consumption of coal?

137 A. I would expect less decomposing action from this gas if sublimed lead was present.

Q. Have you with you, Dr. Dudley, the written specifications prepared by yourself as chief chemist of the railway company designating the pigments which are to be used in the preparation of paints?

A. I htink I have in my bag at the hotel a specification for a Tuscan red and freight car color, simply incidentally, for I used them for another purpose last week, but I did not bring with me any specifications for this purpose. I can give you those if you want them.

Q. Well, in the specifications as far as you have prepared them, have you universally required the use of some percentage of sublimed lead?

A. We have not.

Q. Have you in any case required it?

A. We have not.

Q. Then if we judge of the value and desirability for useful purposes of sublimed lead in admixture with other pigments in the preparation of paint by the use or non-use of the same by your railroad company, we would conclude that it is not a very desirable ingredient, would we?

A. I do not think you would quite be entitled to that, as we have not yet prepared any specifications involving the use of statutory pigments either. The question is under investigation. I think that I have already stated that we have not reached a final conclusion yet.

Q. Then is sublimed lead a pigment of such comparatively

138 new and recent use in the evolutionary process of the manufacture of paint that the Pennsylvania Railway Company,

with the great chemical department controlling that part of its business, has not yet found it advisable or desirable to specify it as an ingredient?

A. That would hardly be the correct statement of the case. The reason why the specifications involving either statutory pigments or sublimed white lead have not yet appeared is simply the pressure of other work, more important work, especially where safety is involved, and the chemical department is more than loaded with work at the present time, and the effort has not yet sufficed to reach this feature. In our work on chemicals we intend- later on to cover this ground, but were switched off by the direction of higher authority to the study of such subjects as involved the safety of life and property. The reason why it has not yet received more consideration is not because of the newness or because we do not consider it a good material or an important subject, but other things more important have taken precedence.

Q. You must at least say, I should think, Doctor, that your investigations of sublimed white lead have not led you to class it—to put it on an equal plane with the statutory pigments?

A. Well, do you mean by that that I have not put it upon the same plane with the statutory pigments mentally or as relating to output or work done?

139 Q. For the purpose for which paint is considered desirable and useful, both—body, durability and opaqueness, pleasing appearance to the eye—all the purposes for which paint is desirable?

A. Well, if you mean that I do not consider sublimed white lead having those valuable properties, I should say no, for I do consider it as having those valuable properties. If you mean that this knowledge and opinion on my part has not yet reached a public expression in the form of a specification, I say yes, for it has not yet reached that.

Q. Sublimed white lead has been upon the market as a commercial product for about how long?

A. I think some of the other gentlemen can tell you better than I, but I would say from memory ten years or more.

Q. Well, is it not a fact that it is only about five years since it has been in use?

A. I think the increase in its use has been within the last five years, the great increase.

Q. Can you tell us what percentage it constitutes of all material or agents used as pigments?

A. No sir, I could not give you any answer.

Q. You could not tell me?

A. I have no judgment.

Q. You do not know that it does not constitute as much as five per cent.?

A. No, I do not know that it constitutes twenty. I could not give you any estimate that would be of any value.

Q. Well, is it not true, Doctor, that among expert chemists engaged in the study of the manufacture of paint that the

140 desirability and value of sublimed lead is a matter of great debate and doubt at this time?

A. In my experience with the manufacturers, and many of them come to Altoona for interviews, I find a growing, a rapidly growing belief that sublimed white lead is a valuable pigment.

Q. Well, just answer the question.

A. I do not know whether I have given that. I will give you anything——

Q. Just answer if it is not a matter that is open to serious debate, and is not the value of it questioned by many of these experiments?

A. I do not think I can say that, sir. The experience which I have had indicated exactly what I said, that the objections first raised against the material when it first appeared are rapidly disappearing and the bulk of the trade as I meet it is indicating that it is a valuable material and going into use. To illustrate, if you choose, we recently put out an experimental specification, based upon white lead and leather black or pigment. We required that each manufacturer should send a sample gallon that would be regarded as standard with which shipments might be compared later, this being an experimental specification. One of the dealers wrote me a personal letter and asked if he might substitute sublimed lead for white lead, and I answered we would be glad to see a sample gallon but

141 afraid whether it would dry properly. He sent the sample gallon and it proved satisfactory in every sense, so far as the uses went, so far as drying.

Q. Is it not true that a considerable number of old and well established paint manufacturers in the preparation of the mixed paints excluded the sublimed lead altogether as a pigment?

A. You would have to ask somebody else that, for I don't know. I am not well enough informed.

Q. Is the composition of sublimed white lead uniform?

A. I don't think I could say that of my own knowledge. Our examinations have hardly gone so far as to entitle us to a positive statement.

Q. Assuming, Dr. Dudley, that in the examination of different samples of sublimed white lead it has been found that lead sulphate varies in the percentage from seventy (70) up to eighty-two (82), and that lead oxide varies in the percentage from fifty-five-hundredths (.55) of one (1) per cent. up to twenty-three (23) per cent., and that zinc oxide varies from six and thirty-three-hundredths (6.33) per cent. up to seven per cent., and that lead carbonate varies from nothing up to nine and forty-two-hundredths (9.42) per cent., you would say that there was no uniformity in the composition of the component parts would you not?

A. I would regard that as quite ununiform.

Q. And that being true you could not with certainty predicate results from different samples or from samples which showed such widely varying important composition, could you?

A. If I remember rightly the constituents which you read

142 are all of them legitimate materials and the question of proportions absolutely requisite in any given case of those legitimate paint materials has never to us been a prominent one, provided

enough of the essentials are present to give you the proper covering power, opacity, etc., Therefore, while I am not a manufacturer, I would think that these materials used in percentages in the constitution of paint might be regarded as giving a satisfactory paint.

Q. Which would you regard as the more satisfactory proportion, sublimed lead, used as a pigment, I mean which contained 23 per cent. of lead oxide or one which contained .55 per cent. of lead oxide?

A. I don't believe that my studies on sublimed lead would entitle me to express an opinion positively on that subject.

Q. What effect does the mixing of lead oxide with pure linseed oil have?

A. Do you mean litharge?

Q. Sir?

A. Do you mean litharge?

Q. Well, I mean the lead. Well, Doctor, what I mean is the lead oxide that appears in this sublimed white lead.

A. So far as our knowledge goes, it does not behave as lead oxide known as litharge, while mixed with paint. I say, so far as our knowledge goes. In other words, I tried to avoid passing an opinion in my direct testimony on the constitution of sublimed white lead, for I didn't feel satisfied and I don't know anybody that does
143 absolutely. However, the lead oxide known as litharge, while mixed as a constituent of paints, combines even in the color as we say, that is, standing on the shelf, with the oil, giving an insoluble material which is not valuable later on. The lead oxide in sublimed lead I would not expect to do that way, but I can not say positively whether it does or not.

Q. Litharge in combination with vegetable oil is apt to set and become very hard, is it not?

A. So far as our experience goes, yes sir.

Q. And you cannot say from your examination of sublimed white lead but what the lead oxide or the agent which is classified as lead oxide that it may produce the same effect?

A. I can't say that.

Q. Now, is turpentine one of the thinners which is extensively used in the preparation of mixed paints?

A. I would expect so, yes sir. We find it frequently.

Q. Can you tell me whether the use of turpentine with sublimed white lead frequently forms a gelatine mass or substance?

A. I have never had that experience.

Q. You have never had that experience?

A. No sir.

Q. Of course, if the body of the mixed paint hardens in the can, its use for commercial purposes is very largely impaired, if not destroyed, is it not?

A. I would say so, yes sir.

Q. Do you know whether this hardening property coming
144 from the presence of the lead oxide is sometimes overcome by the use of glycerine?

91

A. I have never struck that. It might be possible but I have never struck it.

Q. Do you know how the paint in which sublimed white lead is used for a pigment acts in cold weather as to the ease with which it spreads and comes from the brush?

A. No, I don't think I have had any practical experience on that.

Q. The Pennsylvania Railroad has not used enough of that so that you can tell very much about it?

A. It would not come under my scope except to try little samples in the laboratory.

Q. Do you know whether it is uniform in color?

A. Sublimed white lead?

Q. Yes?

A. I have seen very little of the dry material. I have had a few samples sent me of the dry material and that was fairly uniform in color.

Q. Will it ever get in or turn in a sort of a bluish cast?

A. The blue lead, as I understand it, is a cognate product and manufactured by the Picher Lead Company, is bluish in cast but I have never noticed the sublimed lead as having any special tints.

Q. Are you acquainted with the English Chemist, Hurst?

A. I don't know him except through his book, which I have seen.

145 Q. Are you familiar with his writings?

A. Not familiar. I have looked over his book and have it, but I have not studied it.

Q. Is he considered an authority in the chemical world?

A. Really I would not be able to express an opinion as to his standing. I am not enough acquainted with his works to say how he does stand.

Q. Will his works be found in the scientific libraries?

A. Yes, I think so.

Q. I read the following as his definition of some of the qualities of white lead:

"White lead possesses all the good qualities desired by a painter, namely, good color, body, covering power and perman-cy. It is distinguished from all other pigments by the ease with which it mixes with oil and by forming a paint which readily flows from the brush, whereas most pigments, as for instance barytes, tend to work what the painter calls slimy or livery and streaky. White lead does not exhibit this property but flows freely and evenly from the brush."

Q. Would you agree with that conclusion of Professor Hurst, as to the quality of white lead?

A. Not in toto.

Q. Returning now to the ingredient, barytes, used as a pigment in the preparation of mixed paint, what would you say as to its possessing the quality known as body?

A. If by body you mean hiding power, it practically has none.

Q. Does it work well in oil?

A. I hardly feel competent to express a positive opinion,
146 that being a practical side of the case, that is more the practical side, and with our own experience with the percentage of barytes in paints where we made experiments in the laboratory as to the spreading and working under the brush we have had no difficulty.

Q. Well, of course in paints which you use in which barytes is employed you are careful in your specification to limit the amount of barytes, are you not?

A. We don't allow barytes anyhow.

Q. Don't allow it at all?

A. No sir.

Q. Well, barytes is a very heavy substance, is it not?

A. Yes sir.

Q. What is its specific gravity?

A. I can not tell you that from memory but it approaches that of white lead, if I am right.

Q. Now, it is much cheaper than white lead?

A. I would expect so, yes sir.

Q. Do you know what its cost is as compared with the cost of commercially pure white lead?

A. I don't think I can give you a comparison, but I should assume approximately that, I would think approximately that white lead would cost four or five times as much.

Q. Now, is barytes very extensively used as an adulterant in the preparation of mixed paints?

A. I think I would have to ask you what you mean by
147 adulterant.

Q. As cheapening the cost of the paint without giving it added value.

A. If you mean whether barytes is used as an adulterant, if it is mixed with paints sold as containing only statutory pigments, I would say yes.

Q. It is perhaps the most extensively used of any adulterant in that way?

A. If you had asked me that question fifteen years ago, I would say yes; but I think not now.

Q. There are other adulterants now more extensively used, you think, than barytes?

A. Do you mean in mixed paints?

Q. Yes.

A. I would think so, if you mean by adulterants—let us get clear what you mean by adulterants. Barytes or any inert material to me is not an adulterant, but a valuable constituent of a paint, provided the paint is sold not as pure statutory paints, if you choose.

Q. Certainly.

A. It is not an adulterant, unless the paints are sold as pure statutory paints. Now, if I am right in that definition,——

Q. Yes.

A. ——of an adulterant, I would say that there are other ma-

terials besides barytes that are used as adulterants of mixed
148 paint probably more extensive now than barytes.

Q. Of course, you simply draw the line in regard to the barytes in not wishing to pay for it as something else, that is, if you get barytes you want to pay for it as barytes. That is the proposition, is it not?

A. Well, are you referring to my direct testimony on that subject?

Q. Well, I simply mean that you don't want to be deceived into thinking that you are buying for instance white lead where, as a matter of fact, barytes would be used as the most or in lieu of it?

A. Oh, certainly, that goes without saying.

Q. Well, is it not a fact, Dr. Dudley, that barytes may be and is very successfully used by that class of paint manufacturers who prepare a cheap article and sell it as a superior article?

A. I don't believe I would be able to say that. My experience with the trade on that matter hardly entitles me to an opinion.

Q. Does mixed paint which contains barytes dry as well as white lead in oil?

A. So far as our experience goes, yes sir.

Q. Of course, if you were preparing a given quantity of paint, a gallon or a barrel of mixed paints, the more barytes you could substitute for white lead or for oxide of zinc, the cheaper the gallon
149 or the barrel of mixed paint could be made, would it not?

A. I should think so, yes sir.

Q. And of course used as yourself say, beyond a certain defined limit, it is not valuable as an ingredient of paint?

A. Up to a certain limit we do not find any appreciable interference with any of the valuable properties of paint. Beyond that it would begin to interfere with opacity or covering power, hiding power.

Q. What is the percentage or limit to which, in your opinion, it may be used without detriment to those qualities of the paint?

A. I have already stated equal parts by weight of white lead, zinc white, and any of the pigments of class B may be used successfully.

Q. And that includes barytes, does it not?

A. Yes sir.

Q. In other words it can be used in equal proportions, in your opinion, with white lead and oxide of zinc without detriment to the qualities of the paint?

A. Yes sir.

Q. And you say what may be used, you say any one of the ingredients of class B may be used to the same extent?

A. Yes sir.

Q. Well, now, you don't mean by that, that calcium carbonate may be used to that extent do you?

150 A. It can be used to that extent with the single clause which I have been wanting to get in, that calcium carbonate is especially in the same class as white lead, being a readily decomposible chemical body. Now the finest distinctions on that subject I don't think can be made yet, for we are met by the common experience that putty, which is a mixture of linseed oil and carbonate

of lime or carbonate of calcium, is known to be durable to the extent of 30 or 40 years; also that I am not quite fully satisfied in my mind yet as to whether it is absolutely essential to exclude carbonate of lime from the successful inert pigments.

Q. In all the specifications of the railroad company however during your thirty years of experience you have excluded it, I understood you to say?

A. No sir, we always allow a small percentage for a special reason.

Q. And for some special sort of work?

A. No sir, for any kind of work. In any of the pigments in the market, especially those with which railroads deal extensively, resulting from the method of manufacture we will find a little free acid, and we add a small percentage, limiting the amount to five (5) per cent of carbonate of lime, so that we may remove any free acid that happens to be left in the pigment from its method of manufacture, it being found that the presence of free acid, principally

151 sulphuric, retards the drying of paint.

Q. Calcium carbonate includes what you have mentioned as whitings or what is generally denominated whitings?

A. Yes sir.

Q. And that includes chalk and marble dust, you say?

A. Yes sir.

Q. Now, those ingredients are amongst the ones most commonly used in the adulteration of paint, are they not?

A. Which ones do you mean?

Q. Well, the chalk and marble dust, and the lime—the carbonate of lime under this general term, I suppose?

A. We do find in many of the samples of mixed paint which we have examined great percentages of carbonate of lime. I am hardly able to say it is the more common of the substances. I am inclined to the idea that sulphate of lime and a pigment that is not mentioned in class B, which we would group under the general common name of kaolin or clay, is very extensively used.

Q. You say that you permit a certain percentage of calcium carbonate in paints, in mixed paints, which you employ on account of the presence of a certain acid in them——

A. Which may be in them.

Q. What is the limit of the percentage which you consider may be used, of carbonate of calcium, without detriment to the usefulness or useful quality of paint?

A. In our present specifications the limit is five (5) per cent. of the weight of the pigment.

152 Q. And would you consider the presence of more than five per cent. of the calcium carbonate in the mixed paint as clearly coming within the definition of a commercial cheapening or adulterating of the mixture?

A. I would say that I would regard that any paint may contain a certain amount of the class B pigments; that the amount thus far which we have allowed as the result of our studies of carbonate of lime is five (5) per cent. I am not prepared to say that that is the ultimate limit which further study might lead us to finally prescribe.

Q. I am asking you if under your present regulation and as the result of your investigation up to this time five (5) per cent. is the limit?

A. Yes sir.

Q. And you would consider, in the present state of your investigations that the finding of a larger percentage of that adulterant would constitute the adulteration of paint, would you not, and would diminish its value?

A. I would think possibly it might diminish its value but the fact is that many of these other substances mentioned in class B are of about the same price as carbonate of lime, and consequently I am in a dilemma in saying that some other might be used. We say that we prefer the other ones. Do you get my idea?

Q. In your testimony in chief the only one of the substitute pigments of class A to which you have alluded is the sublimed lead, is it not?

A. Yes sir.

153 Q. You have not been interrogated in regard to nor testified concerning standard zinc lead white commonly called zinc lead, zinc made from western ores nor the artificial pigment known as lithopone?

A. No, sir.

Q. You have testified in regard to none of those?

A. No sir, not yet.

Q. You have not found it advisable in the conduct of the business of your department to employ any of those pigments in the preparation of your paints?

A. We made some study some years ago.

Q. I just asked you if you employed them?

A. We have not.

Q. And spending, as your company does, a million dollars a year approximately in the purchase of paints?

A. Paint materials.

Q. Paints and painting materials?

A. Yes sir.

Q. The only one of the substitute pigments mentioned in class A which your company has used is sublimed lead?

A. I am hardly able to say that, because we do not examine all the paints, as I have already stated, and do not know whether zinc lead or zinc from western ores and sometimes lithopone may not be present. I can not say that it is not.

Q. There are none of those three standards of a character which has heretofore led you to specify or require the use of any of them in paints purchased for the Pennsylvania Railroad Company?

A. They have not.

154 Q. And you would say, generally speaking, that they are so new in point of use and are of such untried and undemonstrated value as pigments in the preparation of paint that you do not consider it wise or safe to specify them?

A. I would hardly say that.

Q. But as a matter of fact you do not?

A. We have not for reasons already given.

Q. And if they are used in any of the paints that your company uses, it has been without your knowledge?

A. Thus far, yes sir.

Q. You stated, Dr. Dudley, that mixed paints purchased by your company were bought upon the strength of the brands or the names of the manufacturers, did you not?

A. Largely that, yes sir.

Q. And that you yourself were not concerned in the purchasing department and hence could not state whether any of the mixed paints in question were purchased from any of the complainants in this suit. That is true?

A. That is true, yes sir.

Q. Now, does not the purchasing department of your company buy such paints as are specified in your requisitions upon them?

A. If you say your requisitions, no sir.

Q. Upon your directions?

A. No sir, only as the purchasing agent has, for every material that we specified on, a printed specification; and he buys strictly in accordance with that specification.

155 Q. Now, if in your printed specifications you have mentioned paints manufactured or prepared by any of the complainants in this case, would you not recall that fact?

A. We have not specified—I have already stated that we have not specified any paints where the statutory pigments are involved. We have not prepared a specification involving the statutory pigments or any of class A pigments.

Q. You have prepared specifications in which you permit of the purchase of paints of a given brand manufactured by particular concerns, do you not?

A. No, sir.

Q. What do you say? I do not understand you when you say that you do purchase certain paints upon the strength of the manufacturer's name or reputation.

A. Let me illustrate. We want a certain amount of standard freight car color for use. For what we have different specifications. The purchasing agent gets his requisition and places his order, making the specification a part of the contract. On the other hand some portion of the road needs some paint to paint whatever they may have in hand. They make up a requisition on the purchasing agent for so much bridge paint, so much standard so called building color. Now, there are no printed specifications for either of those, and the party making the requisition may or may not specify we would like this material so and so. That does not come under my scope as yet.

Q. But you say that the mixed paints that you purchase from certain manufacturers are taken upon the strength of the names
156 of those manufacturers and that you do not examine the same or test it except for the purpose of getting information as to what it is composed of or what are the substances. That is true?

A. That is true.

Q. Well, then, do you mean that you accept the paint which is sent or which is purchased in that way, without making any test or inspection to see whether it complies with his requirements?

A. Certainly we do, unless the parties interested or the purchasing agent asks us for that information, I may add that the purchasing agent having a flat order to place may frequently ask us which of three or four paints offered we consider the best one: That is frequently done.

Q. But you can not recall now, on looking over the names of these complainants, a single one of whom you have specified the purchase of any mixed paints?

A. No sir.

Redirect examination.

By Mr. ZEISLER:

Q. Tell us what is your attitude and the attitude of your department generally towards the paint industry?

Mr. WATSON: I object to that as irrelevant and not covered by the issues under examination.

Mr. ZEISLER: I will put another question. In specifying the ingredients of paints in the cases in which you have prepared specifications, and in judging of such other paints as come under your observation, what is the standard that you set?

157 A. I hardly know, because I do not understand the scope of your question. Our specifications are usually the result of first a careful study of the situation. In that way we frequently get from the market a dozen samples, if you choose, or more, of any product which we find that we think will fill the requirements and make careful analyses of those. We inform ourselves as well as we can from the study of paint literature. We consult with the manufacturers of paints. No specification goes out, issued finally, until it has been submitted by the purchasing agent to the manufacturer from whom he desires to buy, with a request for their most rigid criticism of it.

Q. What I desire to direct your attention to is this: Did you at any time set up, generally speaking, so far as the white pigments are concerned, any standard of your own, or was it your attitude that any change in ingredients which would produce a higher degree of efficiency was welcome, so far as you were concerned?

A. By all means the latter.

Q. Now, you will understand what I mean by your attitude. Can you explain it more fully?

A. Well, our attitude would be to keep closely in touch with those who are manufacturing paints and learn as far as possible from them or from any other sources any knowledge that we could apply to our own use in the matter of trade specifications. Not a few of the suggestions as to what constitute a good paint for freight car colors have come from consultations with the manufacturers. We have no ab-

solute standard of excellence to which we can say it must
158 come up to that is fixed and final. Our specifications are always subject to revision in the progress of our knowledge.

Q. In the case of paints purchased wholly or partially on the reputation of the manufacturer, do you frequently have occasion to examine any samples therefrom?

A. I might say yes, if you mean by 'frequently' not regularly but occasionally.

Q. Yes. So then you ascertain that they contain so far as chemical analysis will show?

A. Yes sir, we do.

Q. Have your chemical analyses been so close that you could say definitely that zinc lead white had not been used in cases where you found a large percentage of oxy-sulphate of lead?

Mr. WATSON: Objected to for the reason that the witness has already stated that he has not examined it or any of the submitted pigments of class A except sublimed lead.

(Whereupon the question was here read by the reporter.)

A. I do not think that would be possible.

Mr. ZEISLER:

Q. It would not be impossible for you to definitely determine that fact?

A. No sir.

Q. Considering the limit of closeness of the analyses made by you, state whether or not it is possible for you to say that paints examined by you did not contain zinc lead white, assuming that zinc lead white is a combination of sulphate of lead and oxide of zinc?

159 Mr. WATSON: Object to that as too indefinite and calling for the mere possible results of the witness's examination, and is immaterial.

(Whereupon the question was here read by the reporter.)

A. I would be entirely unable to say that the zinc lead white was not present.

Mr. ZEISLER:

Q. From your general knowledge as a chemist would you say that an artificial product consisting of a combination of sulphate of lead and oxide of zinc united by a furnace process would be equally as good or possibly preferable to a combination of carbonate of lead and oxide of zinc?

A. I would expect it would be a superior pigment.

Q. And the reason for your opinion?

A. Because the sulphate of lead is a much less readily decomposable chemical body and therefore would probably be much more permanent in the paint layer.

Q. You have, however, I understand you, not made an examination of standard zinc lead white in its separate existence?

A. I have not.

Q. Neither have you had occasion to make examinations of zinc made from western ores which carries in its natural composition varying proportions of sulphate of lead and oxide of zinc?

A. I have not.

Q. Assuming that such zinc made from western ores carries in its natural composition a proportion of sulphate of lead mixed with oxide of zinc, what would be your opinion as to whether it
160 would be equally as good or whether it would be better than oxide of zinc?

A. I would expect it to be a superior pigment.

Q. You have not made any examination of lithopone, I understand?

A. Not recently. When the material first appeared we examined it, and in those early days it seemed to be quite the thing we had been hunting for, something that was free from the objections to white lead and zinc white, but the material passed out of prominence for some reason which I am not familiar with and it has never come forward into our realm prominently since.

Q. Do you use enamel paints in the various uses for which paints are used by your railroad?

A. We do.

Q. Do you know whether those enamel paints which you purchase do contain lithopone or not?

A. I am unable to say positively. I do not have in mind any recent analysis that indicated the presence of it.

Q. Could you say that there was not?

A. I could not.

Q. You have spoken of the colors required for the paints for which you have prepared specifications. What colors do you use on fences, buildings and in other cases where building paints are used?

A. Our present standard is two shades of drab which is white toned either in lamp black or umber, but we have no specifications for those paints yet.

Q. You told us that outside of those few cases for which
161 you have prepared specifications, you have considered the question as to what should be specified for other purposes, but have not had the time to formulate your instructions in the form of specifications?

A. Yes sir.

Q. Is that correct?

A. That is correct.

Q. Have you reached definite conclusions regarding the advisability of specifying some of the pigments of class B in mixed paints wherein opaque white pigments will be necessary?

A. We have.

Q. What are those conclusions?

A. The conclusions are that we would in these proposed specifications make a certain percentage of the class B pigments or their equivalent an essential feature.

Q. You answered in reply to questions of Mr. Watson as to the effect of sulphur gas upon carbonate of lead and oxide of zinc. Are there atmospheric influences other than those of sulphur gas which tend to decompose carbonate of lead and oxide of zinc?

A. I wish I could give you some positive statements on that point, but I do not think the chemistry is worked out. In our experience water is the element most destructive to paints. That we get constantly from the rainfall.

Q. Has that a decomposing influence upon carbonate of lead?

A. We assume so because we find the white lead paint layer decomposed and assume that is is the water largely that does it.

Q. But whatever it may be, whether it is of water or the
162 moisture in the air or some other quality of air, is it true that you notice that carbonate of lead becomes decomposed when it is exposed to the influences of weather or atmospheric conditions apart from the influence of sulphur gas?

A. I think I am perfectly safe in saying yes.

Q. In other words this decomposing influence of atmospheric conditions has become apparent to you from your observations, has it, even where the painted surface is away from railroad cars and the possible deterious effects of coal smoke?

A. I have had less experience in our situation than could be desired possibly in order to enable me to make a positive statement. My general belief, however, is that white lead in that situation is more inclined to decompose and go to pieces than some other pigments.

Q. Is the same true of oxide of zinc?

A. Oxide of zinc likewise.

Q. Your attention has been called by way of a suppositious question to the possibility of variations in the composition of sublimed white lead. Please state whether commercial carbonate of lead is subject to variations in its composition?

A. So far as the analyses go, within fairly reasonable limits white lead is a moderately constant body, possible variations of one or two or three per cent. in its constituents. I am hardly able to tell you how wide the variation—may be five per cent. of the hydrate of lead and the carbonate of lead. I do not know as I can
163 think of any as wide as five per cent. but they are fairly close. I am speaking now of what is called pure white lead.

Q. Have you had occasion to examine, by way of analysis, a wide range of commercial carbonate of lead standing by itself, I mean as a commercial article and not as white lead in oil, nor as an ingredient of mixed paints?

A. We have examined both the dry white lead and white lead in oil a number of times.

Q. Suppose that the whiteness of sublimed white lead were not uniform, would that be an objection in any mixed paint except one which is desired to be a pure white mixed paint?

A. I would not expect so.

Q. Now you remember the quotation, or until we verify it we

will call it the alleged quotation from Hurst, that was read to you. Now, I assume that the criticism of barytes there would be subscribed to by you, if barytes were to be used as the only white pigment in a mixed paint. Is that correct?

A. I forget the per cent. of barytes. Will you refresh my memory.

Q. This is the quotation as I find it in the bulletin heretofore referred to:

"White lead possesses all the good qualities desired by a painter, namely, good color, body, covering power and permanency. It is distinguished from all other pigments by the ease with which it mixes with oil and by forming a paint which readily flows from the brush, whereas most pigments, as for instance barytes, tend to work what the painter calls slimy or livery and streaky. White lead does not exhibit this property, but flows freely and evenly from the brush."

A. I have had a little experience with the brushing qualities of barytes and so would be unable to say positively whether that
164 statement is correct or not.

Q. Let me ask you, in view of the fact that it is conceded that barytes lacks in hiding power, and in view of the further fact that its usefulness arises from its inertness, from its comparative indestructability, and that it is considered as a useful ingredient only in connection with bodies having opacity or hiding power, is it fair to institute a comparison as between carbonate of lead on the one hand as a pigment and barytes on the other hand as a pigment?

A. No sir, I would think not.

Q. In other words you would not be understood as recommending barytes altogether as a substitute for carbonate of lead, or for oxide of zinc?

A. I would not. No one would think, I think I may safely say, of using barytes alone except possibly under conditions where covering power or hiding power might not be an essential.

Q. Barytes alone as a paint pigment does not exist, does it?

A. I have never struck it.

Q. Where the color and the necessary or desirable degree of opacity are furnished by the dry tinting color, and where, however, it is necessary to add consistency to the paint, do I understand that there is where you would use barytes in the place of all other opaque white pigments? Or let me say barytes or another of the inert pigments in class B?

A. I would do so, yes sir.

Q. Speaking of the circumstances under which barytes or
165 other pigments that were mentioned are used in excess of the limit of usefulness; is there not a limit to the useful amount or percentage of carbonate of lead in a mixture with oxide of zinc?

A. I am hardly informed on that. I have been told that an excess of one or the other did not give as good a paint, but the manufacturers would be better able to give you a judgment on them than I am.

Q. When you spoke of calcium carbonate in your cross examination and stated that the limit of percentage which you would permit

was five per cent, you refer to those kinds of calcium carbonate with which you have familiarity. Is that correct?

A. That is right.

Q. And you did not intend to include white mineral primer, which I understand you have never examined?

A. I did not intend to include it, because I knew nothing about it.

Q. Doctor, did you mean to be understood as having determined in any wise, either in your mind or by any direction given, to exclude zinc lead white or leaded zinc, that is to say zinc from western ores, and lithopone from paints purchased for the Pennsylvania Railroad?

A. I did not.

Q. Now, you never have had occasion heretofore to specify carbonate of lead as an ingredient of paint, have you?

A. Only in the experimental specifications which I have mentioned.

166 Q. I am speaking now of the specifications for your paint purchases as a basis for contracts.

A. I have never inserted it except in this experimental specification which we were making.

Q. That was not for the purpose of furnishing a basis for contracts, was it?

A. Yes sir, that is a basis for contracts in that particular paint.

Q. How am I to understand the term experimental?

A. Well, this is it. We do not feel yet as though we know enough on the subject to be able to put this thing out and say to the purchasing agent, "buy from anybody that you want to of this material under this specification:" so we decided to call this specification experimental and the specification is forty-five per cent. white lead and fifty-five per cent lamp black, and that is going on a number of cars now being built to see how the compound works as a preventative, tending to keep the cars from corroding.

Q. What I meant was whether you have had occasion to specify carbonate of lead or oxide of zinc in any specification as a guidance for your purchasing agent?

A. Not as yet, except this one.

Q. Still you do not mean to be understood as having formed any conclusion that carbonate of lead is an improper ingredient of mixed paint?

A. No.

Q. Nor do you mean to be understood that oxide of zinc
167 is an improper ingredient of mixed paints?

A. No sir.

Q. Likewise you have never yet had occasion to specify sublimed lead?

A. No.

Q. Do you mean to be understood that you have determined that it is not a proper ingredient of mixed paint?

A. I have not.

Q. In other words the fact that you have not heretofore specified

sublimed lead does not mean a discrimination against sublimed lead and in favor of carbonate of lead and oxide of zinc?

A. That is correct.

Q. Is it true, Dr. Dudley, that the more expensive an ingredient is the greater is the occasion or the temptation for its adulteration?

A. That has been our usual experience.

Q. Do you think that barytes is liable to be adulterated more than carbonate of lead?

A. Barytes. No, I would think it would be the reverse.

Q. Do you think that any of the class B pigments would be more readily adulterated than carbonate of lead or oxide of zinc?

A. I should think the reverse.

Q. How about sublimed lead. Would that be more easily adulterated—would that be more readily adulterated than carbonate of lead or oxide of zinc?

A. Well, you mean by "more readily adulterated" that there would be more temptation to adulterate it?

Q. Yes.

A. I would think there would be more temptation to adulterate as between white lead and zinc white.

Q. From the nature of the article, would sublimed lead be
168 adulterated more easily than carbonate of lead?

A. Well, there comes in a point, which is, if you mean by "more easily," that the adulteration is more easily detected in the one case than in the other, then I would think it probable that—well, I hardly know how to give you a positive answer as to that. Certain combinations of white lead and zinc white with certain inert pigments might be difficult to detect and certain combinations of sublimed lead with certain cheaper substances might be just as difficult to detect; when you say "more easily adulterated," I am led up to the idea of whether the detection is more easy or not. If that is your idea, then I cannot say.

Mr. ZEISLER: That is all.

Recross examination.

By Mr. WATSON:

Q. Of course your company uses a good deal of enamel paint, doctor?

A. Quite considerable.

Q. And I understood you to day that as far as you know, the enamel paint which your company uses does not have lithopone in it as one of the ingredients?

A. I think I said I am not sure. I do not know. I am not sure upon that point. I do not recall any recent examinations of enamel paint that would enable me to say that they had or had not lithopone in it.

Q. You said that lithopone came into some prominence a number of years ago and then disappeared, did you not?

169 A. Yes sir.

Q. And you have not made tests or analysis or satisfied yourself as to its value as a pigment, have you?

A. Our first studies, as I said, led us to be very hopeful in regard to it that it was going to be the most valuable white pigment that we knew of.

Q. Such hopefulness is a different proposition from being entirely satisfied as to its value, is it not?

A. Yes sir.

Q. And you put it in that very qualified way?

A. I think that I might go a bit further, namely, that experiments with it seem, to indicate that it had covering power and body and working qualities and chemical inertness, all of which we were hunting for and which are not so characteristic in many of the cases, at least not of the statutory pigments.

Q. But you know that an absolutely first class quality of enamel paint is manufactured and to be found on the market in which lithopone is not used as an ingredient, do you not?

A. Well I was thinking whether I have in mind any anaylsis. I understand you to say there may be good paints made without it?

Q. Yes sir.

A. I see no reason to question that, although I can not give you positive statements.

Q. And if lithopone be employed as an ingredient of enamel paint, it is not because a first class quality of enamel paint may not be made without it?

A. So far as my knowledge goes, I will say no.

170 Q. And if any lithopone is used, it would be because it would be cheaper than the other pigment or ingredient in lieu of which it is employed?

A. I would hardly think that could be stated.

Q. What would be the ingredient in lieu of which lithopone would be used in the manufacture and preparation of enamel paint?

A. It might look better.

Q. I say in lieu of what pigment would that be used?

A. In lieu of zinc white.

Q. Well, lithopone is a very much cheaper article than zinc white, is it not?

A. I am unable to say. I do not know the lithopone price at present.

Q. Well, now, lithopone varies a great deal in the different kinds that are put upon the market, does it not, or do you know?

A. I do not know. I tell you I made no recent examinations.

Q. You don't know it varies in price all the way from three-fourths of a cent all the way up to seven cents?

A. No sir, I do not.

Q. Well, suppose that you used a coat of this, applied it over a first covering of lead or zinc paint, what would be the effect of it?

A. I really have no experience upon it.

Q. You don't know?

A. No sir.

Q. You don't know for the resurfacing of a house or object which is to be painted the second time, what the effect would be of

171 using the mixed paint containing lithopone when the first coat had been lead and oil?

A. No sir, I could not tell you that, for I really have no experience.

Q. Of course, doctor, it is true, is it not, that the statutory pigments command a higher price upon the market than the great bulk of substitutes mentioned in A and B. That is true, is it not?

A. So far as my knowledge goes, yes sir.

Q. And yet it is your opinion that some of these substitutes when mixed with the statutory pigments produce better results?

A. Yes sir.

Q. Now, you mean by that, I suppose, better results in view of the price at which it costs?

A. No sir, I think they make a better paint.

Q. Make a better paint?

A. Yes sir.

Q. Then it remains true nevertheless that while these pigments mentioned in A and B produce in combination a better result, yet on the market they are cheaper than the statutory pigments, are they?

A. I think that is right.

Q. So then you would not conclude, because the statutory pigments maintain the world over a higher range of prices upon the market as commercial products, that they are more valuable for the purpose for which they are necessarily used in the manu-
172 facture of paint than some of these pigments mentioned in A and B?

A. No, I would not.

Q. You would not?

A. No sir.

Q. Then you would to that extent disagree with the general conclusion of the mercantile and the business world, the most of the people who use paints, in their estimate of the comparative values of these pigments, would you?

A. Well, I do not know as I would quite say that. In the first place I am not quite familiar with that being the general conclusion of the world as to the value of these ingredients at the present time.

Q. But you say that you do understand that the statutory pigments command the higher price?

A. Yes, but that may be due to cost of manufacture.

Q. But if the substitutes mentioned in A and B serve the purpose of the statutory pigments, what good reason can you give for their not commanding the same price commercially?

A. The reason being, because they cost less to manufacture, in the first place; and, second, because any established industry, in my judgment, holds the ground it has obtained for a period of time, notwithstanding the tendency towards the abandonment of the use of any expensive material when a cheaper substitute is found that does the work. Hundreds of illustrations could be given of that.

Q. Now, if the matter of cost did not enter into the determination of the material which you were going to specify for use in your railroad company, I understand you to say that you nevertheless
173 would employ many of these substitutes mentioned in A and B?

A. Yes sir, I would.

Q. You would employ barytes in some cases, if the cost would be the same?

A. Well, barytes. Let me put that clear. There are in our studies eight substances known as inert pigments. Five of them are mentioned in the bill and commonly called here class B. Of these eight we prefer some in general, as a result of our studies; and barytes we do not usually accept under our specifications, because there are others equally as valuable, so far as we know, that cost less.

Q. But, if it is more expensive than that—I want to know then, if the price of a barrel of mixed paint was the same whether you used statutory pigments alone or whether in connection with them you used some of the substitutes referred to in A and B, you nevertheless would choose the substitutes?

A. I would.

Q. So far, as you say, you don't personally agree with the standard which is apparently set up by the commercial world as to the comparative value of the statutory and substitute pigments?

Mr. ZEISLER: Objected to as assuming a state of facts which is not borne out by the evidence; nor do we by not objecting wish to admit that such a statement can possibly be the fact.

(Whereupon the question was here read by the reporter.)

174 A. I am unwilling to accept your statement that the census of opinion of the commercial world is that these are the best pigments and therefore I should hardly be able to answer your question as I would like.

Mr. WATSON:

Q. Now, in the paints, both mixed and other qualities and kinds which are used by your company, is it not true that you order and that you do actually obtain a very large proportion of carbonate of lead and oxide of zinc as constituents or ingredients of those paints?

A. Well, I do not know exactly what you mean. I have already tried to explain to you five or six times that we have not made any specifications, so far as our paint and the like goes, which cover the statutory pigments.

Q. I don't care for your specifications. I want to know as a practical proposition, aside from the specifications, whether the paint which is used by the railway company and which costs about a million dollars a year is not principally made up as to its pigments of carbonate of lead and oxide of zinc?

A. I think I get your point. The analysis which we have made from these paints, which we buy from specifications, do show the presence of carbonate of lead and white zinc,——

Q. Will you tell me if as much as seventy-five per cent. of all the pigments used in the paint which the Pennsylvania Railroad Company employs consists of carbonate of lead and oxide of zinc?

A. I don't believe I would be able to say that.

Q. Will you tell me what per cent. in your opinion is represented by the use of those two pigments?

175 Q. Well, I wish I could tell you, but it would be the wildest guess work.

Q. Well, give me your guess if you can do no better.

A. Now, your question means what percentage of the total pigment used by the Pennsylvania Railroad Company is the statutory pigment?

Q. Yes?

A. Well, it would be the wildest kind of a guess. I would not believe it would be even twenty or twenty-five per cent.

Q. Then you use a substitute pigment and thereby of course very greatly diminish the total cost of the paint that you use?

A. I think you ought to get the point in your mind. A very large percentage of our paints contain no statutory pigment, don't require it. They are not built that way. They are made of other constituents; by far the largest proportion of the paints in use are oxide of iron paints. And so I want to give you that fact, so you may the more intelligently question me.

Q. Well, oxide of iron of course is purely pigment, is it not?

A. What do you mean?

Q. You call that the pure pigment, oxide of iron?

A. I think I will have to ask you to define what pure pigment is.

Q. What you would call commercially pure, I suppose?

A. Venetian red may contain anywhere from sixteen (16) to thirty-five (35) per cent. of oxide of iron and be a commercially pure pigment, depending upon the condition of its manufacture. Prince's metallic forty (40) per cent. of oxide of iron, it being

176 a constituent of the rock which we grind up.

Q. Now, those, of course, are the classes of paints that are the most extensively used by the railway company, in the painting of its cars and buildings along the right of way and so on.

A. A good many things are painted with those reds.

Q. With those red paints?

A. Yes sir.

Q. Perhaps fifty (50) per cent. of all the paint you use are those colors?

A. I should say possibly so.

Q. In which the oxide of iron is used as a pigment?

A. Yes sir.

Q. Of course it costs a large sum of money to maintain the chemical department of your railroad?

A. Well, altogether somewhere about $20,000.00 a year.

Q. And your department deals exclusively, as I understand it, with the subject of paints?

A. No sir.

Q. What other subject do you deal in?

A. Iron and steel in enormous quantities. The bulk of our work is in connection with iron and steel alloys. Oils for lubricating and burning. Plush used in the cars. We examine all the substances that we need. We have about forty specifications, chemical and physical. We are a branch of the whole; the chemical department. It is a principle of the Pennsylvania Road that before a bill is signed

somebody in the employ of the company must certify as to the quantity and quality, and we are a portion of the testing
177 department.

Q. Now, when you buy an article, say paint for use by the company, you want to know what the constituents and the market value of that paint is, in view of the ingredients which enter into it. That is one of the purposes of the department, is it not?

A. Certainly.

Q. And of course originally as you are a large user of paint it is possible for you in that way to ascertain and determine chemically just exactly what you are getting?

A. We try to.

Re-re-direct examination.

By Mr. ZEISLER:

Q. Mr. Watson referred to the higher price of carbonate of lead and oxide of zinc as compared with other pigments. Tell us, if you know, whether oxide of zinc is a natural product?

A. I don't know of its occurrence in nature as such.

Q. Where does it come from in the United States?

A. Largely from—I don't believe I can tell you that.

Q. Does it come from the New Jersey mines?

A. I only know what we find on the barrels that the largest portion of it comes from New Jersey, what we get at least.

Q. Does the oxide of zinc so-called in commerce come from anywhere else than from the New Jersey mines?

A. I understand largely from Missouri.

Q. The pure oxide of zinc?

A. No, not the pure oxide of zinc. I thought you meant it simply as a composite.

178 Q. I am talking about what is commercially known as oxide of zinc?

A. That comes from New Jersey, the purest that I know anything about.

Q. What oxide of zinc is meant where there is simply oxide of zinc referred to?

A. I really have not any special knowledge on that subject.

Q. When you use oxide of iron do you mean to be understood as saying that you use some white pigments in addition thereto?

A. If you mean by white pigments either the statutory pigments or the pigments in class A, no.

Q. Or the pigments in class B?

A. We do use in oxide of iron some one or combinations of the pigments of class B.

Q. Well, about what percentage of class B pigments do you use in connection with oxide of iron, in the freight car paint for instance?

A. The highest which the specification required is twenty per cent. by weight of sesqui-oxide of iron and not exceeding five per cent. of carbonate of lime. The balance of the 100 per cent.; may be either one of the class B pigments or three others which are not men-

tioned in the bill which we regard as equivalents, except barytes, and the reason why we exclude the barytes is we buy this paint by weight and use it by volume, therefore we want as light an inert material, as low specific gravity in the inert material as possible. Barytes has heavier specific gravity than all the rest.

179 Q. In the freight car paint that you spoke of could you use instead of class B pigments either or a combination of the statutory pigments?

A. I see no reason why it could not be used, but the manufacturers would have to look out for the shade. Of course that can be done by a change in the oxides of iron that could be used.

Q. Would it in your opinion make as good a paint, as if you used the class B pigments?

A. You refer to the statutory pigments?

Q. Yes?

A. I would prefer to keep them out.

Mr. ZEISLER: That is all.

Mr. WATSON: That is all.

Witness excused.

Whereupon a recess was taken until 2:30 P. M.

180 United States Circuit Court, District of North Dakota, Southeastern Division.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL., Complainants,

vs.

J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station, Defendants.

Pursuant to an order of this court dated January 8, 1906, all parties in the above entitled cause appeared at the office of Sigmund Zeisler, 1037 First National Bank Bldg., Chicago, Ills., on Monday, January 22, 1906, at 10:00 A. M. Messrs. Sigmund Zeisler and Henry L. Stern appeared on behalf of the complainants and Mr. John S. Watson, of Messrs. Ball Watson & Maclay, appeared on behalf of the defendant.

By stipulation of counsel the testimony of Dr. Dudley was taken before Robert H. Atkinson, which testimony is on file in this court, and further proceedings were adjourned until 2:30 in the afternoon, at which time all parties were present and proceedings were continued before Jessie S. Conover, Special Master, as follows:

181 MAXIMILIAN TOCH, Sworn.

Examined by Mr. ZEISLER:

Q. What is your full name?

A. Maximilian Toch.

Q. Where do you reside?

A. New York City.
Q. What is your business?
A. Paint manufacturer.
Q. How long have you been a paint manufacturer?
A. 19 years.
Q. Always in New York?
A. Always in New York.
Q. Are you a chemist?
A. Yes sir.
Q. Where did you acquire your knowledge of chemistry?
A. I graduated first from the New York University in 1882: I graduated again in 1886; I then took a five years' course under Wallace Goold Levison, from 1882 to 1886, in conjunction with the other course; I was for three years with Prof. Heitzmann, formerly of the University of Vienna, in pathological chemistry, and for two years with Prof. Jelliffe in microbatory micrology and bacteriology. I am a member of the American Chemical Society, the Society of Chemical Industry of England, the Verein Deutscher Chemiker of Germany, the Society of Medical Jurisprudence of New York, the Society of Civil Engineers, the Society for Testing Materials, the Electro-Chemical Society, and the Chemists Club of New York.
Q. What academic degrees have you?
A. I have various degrees, master and bachelor degrees, and a degree in law.
Q. Where was Prof. Heitzmann, under whom you said you took the course?
A. He was formerly phenological professor of chemistry in
182 the University of Vienna.
Q. Is that where you studied?
A. I did not. Prof. Heitzmann came to New York and took a certain number of pupils in the manner of tuition that is given in some of the German Universities. There was about four pupils, to my knowledge, the year I was there, and to whom he gave personal instruction which at that time was regarded as the ideal method of laying this rather abstruse science.
Q. How many gallons of mixed paint do you manufacture per year?
A. Well, just at present, or within the past year, about between twenty and twenty five thousand per month.
Q. Do you sell any paint in the state of North Dakota?
A. We do not.
Q. Do you manufacture in your own name or under a firm name?
A. Under the firm name of which I am a member.
Q. What?
A. Firm of Toch Bros.
Q. Have you, since you began to manufacture, kept up and kept informed of the progress of chemistry?
A. I have tried to.
Q. You have during those years worked in a chemical laboratory?
A. Yes sir.
Q. Yourself?

A. Yes sir.

Q. State whether or not you are called in by other paint manufacturers of the United States as an expert to advise them as to the proper ingredients and percentages of ingredients to be used in paints?

A. I am.

183 Q. Extremely so?

A. More often more extensively than I want or than I have time.

Q. You may state whether you consider yourself an expert on the technology of paint manufacture?

A. I prefer not to answer that.

Q. Are you regarded by others as an expert?

A. Generally, yes.

Q. Have you made analyses of the various pigments used in paint and have you made analyses of mixed paints in the course of your 19 years' experience as a manufacturer?

A. Personally I have made a great many analyses. Within the last few years, particularly in the last four years, having three chemists under me, I do very little routine work. I principally do research work myself but my assistants make the general analyses.

Q. Under your general supervision?

A. Under my supervision.

Q. And you become aware, do you, of the results of those analyses?

A. Always.

Q. Have you also made physical tests and experiments as to the quality of paints when subjected to exposure?

A. Yes sir.

Q. How extensive have those experiments and tests been?

A. My experience in that regard is very large and varied. I have gone so far as to spend $2,000 for a single test, in so far that I have had a building painted at my own expense, which was par-

184 ticularly exposed and subjected to conditions which I could not duplicate in a laboratory. That is the largest amount I ever spent for a single experiment. I have spent varying sums in having fences and bridges and metal structures painted in order to determine for myself the actual conditions which would take place after severe or chemical exposure. In addition to that I have perhaps—I couldn't say exactly, but a great many hundred exposure tests on the roof of my laboratory at present.

Q. Are you thoroughly acquainted with the properties of carbonate of lead and oxide of zinc, which I will hereafter refer to as the statutory pigments?

A. Yes sir.

Q. Have you made examination of sublimed lead, zinc lead white, zinc from western ores and lithophone, or any of these, which I will hereafter refer to as Class A pigments?

A. Yes sir, I have.

Q. I will hereafter refer to barium sulphate, silica, silicate of magnesia, calcium carbonate and sulphate of lime as Class B pig-

ments, and I will ask you whether you are acquainted with the properties and qualities of these?

A. I am.

Q. Speaking of the uses of these white pigments as ingredients of mixed paint, I will first ask you to state the qualities of carbonate of lead and oxide of zinc when used either as a single white pigment or in combination, and their shortcomings, if any. I mean a combination of the two or singly.

A. Carbonate of lead, commonly known as white lead, is a
185 rather unstable pigment. Its composition is uncertain, depending largely on the method by which it is manufactured. If it is subjected to the action of gases, particularly sulphur gases, and when exposed it blackens readily and decomposes. It is also a poisonous pigment. Oxide of zinc is more stable than white lead, is non-poisonous and not readily affected or not visibly affected by gases, and when used alone does not make as ideal a paint as when mixed with carbonate of lead.

Q. What is the effect of atmospheric conditions other than sulphur gases upon oxide of zinc when used alone as a white pigment or mixed paint?

A. Atmospheric influence is felt by chemical compounds which are incomplete. By that I will say that oxide of zinc very readily combines with any other element, and, while you cannot see it combine with sulphur, it nevertheless does so. It dries, through various influences of moisture and sunlight, so that it becomes eventually very hard and brittle.

Q. And the effect of that brittleness is?

A. To chalk, to crack and dislodge itself or peel.

Q. When you speak of exposure have you reference now to any particular kind of exposure or do you mean what you say in reference to all exposure where surfaces are painted standing in the open air?

A. Exposure generally means standing in the open air.

Q. State whether or not there is an aptitude on the part of carbonate of lead to form some chemical combination with some of the elements contained in linseed oil?

A. There is an aptitude for white lead carbonate to com-
186 bine with linseed oil.

Q. Do you regard that as an advantage or a disadvantage?

A. Well, it is usually regarded as a disadvantage.

Q. How do you regard it?

A. I regard it as a disadvantage.

Q. How is it about oxide of zinc? Is there such an affinity there?

A. Not so great.

Q. But is there?

A. There is to a much lesser degree.

Q. Now, state whether or not this chemical combination that is formed between carbonate of lead on the one hand and oxide of zinc on the other hand, and linseed oil, is in the nature of a decomposition or works a decomposition of those elements?

A. It does.

Q. Do you mean to say that there is decomposition of the carbonate of lead and oxide of zinc only or is there also a decomposition of the linseed oil?

A. There must be a decomposition of all.

Q. Is this decomposition hurtful to the linseed oil?

A. It is.

Q. And is it hurtful to the carbonate of lead or oxide of zinc as the case may be?

A. It is.

Q. What particular useful quality or qualities of mixed paint does this chemical affinity impair?

A. It impairs what is known as the life of the paint.

Q. You mean it impairs the durability of the paint?

A. Durability, yes sir.

Q. What is the effect of moisture on oxide of zinc?

187 A. I don't think I am prepared to go into that. Do you mean oxide of zinc as a paint, to use as a finished paint?

Q. Well, I mean oxide of zinc as an ingredient of mixed paint, in connection always with other ingredients making up the mixed paint.

A. I didn't understand.

Q. All my questions are with reference to the effect upon the mixed paint or the pigment in mixed paint.

A. Well, an oxide of zinc paint pure is known not to withstand water but to be decomposed by water.

Q. How about a mixed paint which has other white pigments in addition to oxide of zinc: is there any effect of the water or moisture upon the oxide of zinc in the mixed paint?

A. An effect which is deleterious.

Q. You spoke until now about the effect upon carbonate of lead on the one hand and oxide of zinc on the other hand of exposure, and of the chemical combination formed as between each of these white pigments on the one hand and linseed oil on the other hand. What is your opinion as to whether the same defects exist, either in the same or in a lesser degree, when carbonate of lead and oxide of zinc are combined as white pigments in mixed paint, without the addition of any other white pigment.

A. A combination of the two is better than either one singly.

Q. That does not answer my entire question. Are those deleterious effects present in the same or in a lesser degree where those two statutory pigments are combined?

188 A. Naturally in a lesser degree.

Q. In a lesser degree, but do they exist?

A. They do exist.

Q. Has it formed the study of paint manufacturers and experts how the defects of the st-utory pigments or a combination of the two may be overcome?

A. Yes sir.

Q. How long?

A. Oh, as far back as I can remember.

Q. Has any definite result been attained among those considered best informed?

A. Yes sir.

Q. What is that result?

A. It has been definitely found that the admixture of inert materials to mixed paints improves them and increases their durability.

Q. Without detracting appreciably from their useful qualities?

A. Without detracting at all.

Q. By inert materials do you mean, for instance, materials in Class B?

A. Materials in Class B, yes sir, and likewise materials in Class A.

Q. Take, for instance, barytes, sulphate of barium, what percentage of sulphate of barium would you regard as useful without detracting in anywise from the value of the paint, assuming that that paint contains carbonate of lead and oxide of zinc?

A. There was two, barytes and sulphate of barium?

Q. Take either and take one after the other.

A. Well, I should take one after the other. The natural can be used to the extent of one-third——

Mr. WATSON: Natural, did you call that?

189 A. Yes sir, there is natural and artificial. The natural can be used to the extent of one-third.

Q. You mean one-third of the entire body of the white pigment?

A. One-third of barytes and one-third of each of the statutory pigments. The artificial can be used up to and perhaps beyond one-half, and is very largely used for the purpose of giving paint additional physical qualities.

Q. That artificial sulphate of barium is commonly called blanc fixe, is it?

A. No, artificial sulphate of barium should really not be called blanc fixe because blanc fixe refers to the wet product containing thirty per cent. of water. Some years ago I gave the name to the dry artificial blanc fixe of lake base. I called it lake base and it has since been known to the trade as lake base. I stated at the time and have never altered my opinion since that my firm was the first to make that material.

Q. Do you mean to be understood as saying that the addition of either 33⅓ per cent. of the natural barium sulphate or one-half of the artificial would not detract appreciably from the opacity, of the paint?

A. It might detract some from the opacity, but you would gain other qualities which would far overcome that.

Q. To put it in another form: would this addition of barium sulphate that I referred to in my last question detract from the desirable degree of opacity?

A. Not at all.

Q. What is the meaning of the term blanc fixe?

190 A. It is a French word meaning permanent white.

Q. Do you regard the word permanent in that term as properly characterizing the quality of this article?

A. Can I give the history of the material, a short history?

Q. Yes sir.

A. Blank fixe, is the correct name, was originally used in France as a material for coating paper. Previous to that time bismuth and lead compounds were used, which turned black. It was found that blanc fixe or artificial barium sulphate gave just as light a gloss on the paper and was absolutely permanent under any and all conditions. Its permanency is likewise so regarded by those paint manufacturers who know.

Q. What percentage of silica would you regard as being useful without detracting from other useful qualities in a mixed paint containing carbonate of lead and oxide of zinc?

A. I should say up to one-third.

Q. How about silicate of magnesia?

A. Silicate of magnesia serves a dual purpose. Owing to its low specific gravity, it cannot be used to as great an extent as the other pigments in Class B.

Q. What is the other purpose which you have reference to?

A. The prevention of settling of the paint in the tin or package.

Q. In the bulletin attached as an exhibit to the affidavit of Mr. Ladd, filed in this case, he speaks of sublimed white lead in the following language: "This product is so named because it is
191 prepared by a sublimation process. The product is obtained directly as a very fine, impalpable, white powder, without grinding. Chemically it is very different from ordinary white lead, being apparently a basic sulphate of lead and as prepared by the Picher Lead Company of Joplin, Mo., has approximately the following constitution:

Lead sulphate	75 per cent.
Lead oxide	20 per cent.
Zinc oxide	5 per cent.

"The lead oxide is present not as the yellow litharge, but apparently as a white oxy-sulphate. Its presence has been found to greatly increase the body of the paint, making it entirely different physically from ordinary lead sulphate. The zinc oxide is incidental to the manufacture.

"The specific gravity of sublimed white lead is 6.2, approximately that of ordinary white lead. It exceeds in the fineness of the particles the ordinary grades of white lead and is, at least, equal to them in whiteness, body, covering power and wearing qualities. It differs from the ordinary white leads in being non-poisonous and resists the blackening action of the sulphur compounds of sewer gas and of fuel gases to a much greater degree." Do you subscribe to that?

A. I do.

Q. Have you anything to add to this characterization of sublimed white lead as a pigment of mixed paint?

A. No, I think this is very complete.

Q. In what combination do you approve of the use of sublimed white lead in mixed paint?

A. I would approve of the use of the sublimed white lead in every white mixed paint.

192 Q. In what proportion?

A. That would depend very largely upon conditions. Under ordinary circumstances. If I were a manufacturer in this section of the country, I would probably use it entirely.

Q. Instead of what?

A. Instead of the——

Q. Statutory pigments?

A. Statutory pigments.

Q. Can you say why you qualify that by saying if you were manufacturing in this part of the country?

A. Being a manufacturer on the eastern coast, the freight rates are against us on many of these good materials.

Q. State whether or not the qualities of oxy-sulphate of lead are such as to make sublimed lead, which contains this element, so valuable a pigment?

A. Oxy-sulphate of lead is a desirable compound. It has excellent inherent drying qualities. It has opacity and whiteness and fineness and it lends itself particularly to the making of mixed paints.

Q. How about inertness?

A. It is more inert than either one of the statutory pigments.

Q. What is the effect of that inertness upon the durability of the paint?

A. Quoting from Prof. Ladd's definition here, in which he says, "It differs from the ordinary white leads in being non-poisonous and resists the blackening action of the sulphur compounds of sewer gas and of fuel gases to a much greater degree" than, I presume he refers to one of these statutory pigments. That would be my answer.

193 Q. How about the aptitude of the sulphate of lead to combine with linseed oil?

A. As a chemist, I should say that it does not combine with linseed oil. I have never used oxy-sulphate of lead separately in experiments.

Q. Please state whether the influence of sulphurated hydrogen gas is likely to be present on a farm outbuildings, or where manure piles up?

A. It is very likely to be there.

Q. Would you regard a combination of sublimed lead with carbonate of lead and oxide of zinc in some proportions as better than a combination of only the statutory pigments in mixed paints?

A. I certainly would.

Q. In one of your answers you qualified your statement by speaking of white paints. Would your answers be the same if you were asked with reference to light tints of mixed paint, so far as the value of sublimed lead is concerned?

A. Yes, they would.

Q. Your answers would be the same?

A. My answers would be the same for light tints.

Q. Take the case of a paint where carbonate of lead and oxide of zinc would have been the proper pigments and the only known

proper pigments before we knew anything about these new pigments. In any such case it would be proper to substitute a part of those statutory pigments by sublimed lead?

A. Yes, it would.

Q. Then do you mean to be understood that sublimed white lead may be used as a substitute in part for the statutory pigments wherever the statutory pigments would be used if we didn't have

194 sublimed white lead?

A. If we didn't have sublimed white lead, how could we use it?

Q. I didn't say anything that is subject to that construction.

A. I can't understand it any other way. I don't know exactly what the question is that you are trying to get at.

Q. There are certain things in which you do not use carbonate of lead and oxide of zinc at all; is that true?

A. Yes.

Q. There are, are there, paints in which carbonate of lead and oxide of zinc are used?

A. Yes.

Q. Prior to the time when we had sublimed white lead, for certain purposes we had only carbonate of lead and oxide of zinc, is that right?

A. Yes.

Q. Now that you have sublimed white lead, would you, in all such cases, consider that it would be proper to use sublimed lead in part for these statutory pigments?

A. Certainly I would.

Q. You have thus far answered that the substitution of sublimed lead is proper in part. Up to what extent would you consider the substitution proper? I don't mean from the commercial point of view but from the point of view of the usefulness and efficiency of the paint?

A. The more we would put into the mixed paint containing the statutory pigments, the better the paint would be.

Q. The more sublimed lead you would put in?

A. The more sublimed lead you would put in, the better the paint would be.

195 Q. Now, can you substitute sublimed white lead for oxide of zinc?

A. You cannot.

Q. But can you substitute it altogether for carbonate of lead?

A. You can.

Q. And in your opinion with distinct advantage?

A. With distinct advantage.

Q. State whether or not any mixed paint made of sublimed white lead and oxide of zinc would be superior to a mixed paint made of carbonate of lead and oxide of zinc?

A. It would.

Q. Other things being equal?

A. All things being equal.

Q. Do you know whether sublimed white lead is nowadays considerably used in mixed paint?

A. I know that is is very extensively used.

Q. In shades as well as whites?

A. Well, in mixed paints would imply all shades.

Q. Now, as to zinc lead white, what is your opinion of the value of this pigment?

A. Is this the Canon City White that you refer to?

Q. Yes.

A. That is a very valuable pigment and in proportion or in ratio to the lead that it contains is as good as sublimed white lead.

Q. Do I understand that it is the presence of sulphate of lead in zinc lead white which gives it the virtue that you attribute to it?

A. The presence of oxy-sulphate of lead gives it the additional body, additional covering or hiding power, when used as a paint.

196 Q. Together with a higher degree of inertness than is possessed by carbonate of lead?

A. Correct, yes sir.

Q. Is Zinc lead white better than a combination of carbonate of lead and oxide of zinc?

A. Yes sir.

Q. Now, then, as to zinc from western ores, carrying a varying percentage of oxy-sulphate of lead: what is your opinion as to the value of these pigments?

A. Oh, a zinc oxide which carries lead is superior for paint purposes to a zinc which contains no lead.

Q. Is zinc made from western ores used in the east?

A. Not to my knowledge.

Q. Can you tell the reason why it is not used?

A. For the reason it is too expensive; it costs more than the zinc mined in New Jersey.

Q. Is that the only reason which you know of why it is not used in the east or used as far east as the freight rates tend to make it too expensive?

A. That is the only reason I know of.

Q. Our here in the west where freight rates are not forbidding and where, on the other hand, the freight rate on eastern zinc or New Jersey zinc makes up a considerable factor, what is your opinion as to the value of zinc from western ores?

A. Zinc from western ores, for many paint purposes, is far superior to zinc from eastern ores.

Q. Now, about lithophone: tell us what you know about that.

A. Lithophone is a zinc sulphite and barium sulphate, made
197 by double decomposition, and is a pure white pigment which has very great covering property, extreme fineness and exceptional merit for many paint purposes.

Q. State what objection there is to lithophone as a pigment.

A. I don't know any particular objection to it; I have always favored it very much and I use a great deal of it myself.

Q. Well, its photogenic action is what I refer to.

A. Oh, I beg pardon; yes. It is presumably supposed to absorb light during the day and give it out again during the night, and in the process of absorption it turns color, turns gray, and it turns white again in the darkness.

Q. State whether or not this objection is of any importance when lithophone is used in paints covering inside surfaces.

A. It is no objection to it at all and no objection in making light tints.

Q. Do you mean to say that it is an objection in dark tints?

A. Oh, it is not necessary in dark tints, it being a white paint.

Q. Then you mean to say that it has no objection except possibly in the case of outside white paint?

A. Outside white.

Q. How would lithopone serve as a pigment in mixed paint used for a first cost, to be repainted or covered by another coat?

A. It has a very large use for that particular purpose, particularly in what is known as first coat flat enamels. The word flat enamel is really a paradox, enamel meaning gloss it could not possibly be flat, and yet, that term has crept into the paint
198 trade.

Q. This photogenic tendency is no objection to lithophone so long as it is used, even on the outside, in paint as a first coat?

A. None at all.

Q. And when paint is used in covering outside surfaces with a first coat, does the presence of lithophone in it as a pigment in any wise detract from its value?

A. None whatever.

Q. Does it add to the value?

A. That is problematical.

Q. State whether or not lithophone is widely used to advantage in enamels?

A. Lithophone is used very widely to advantage in enamels?

Q. What is an enamel?

A. An enamel is a pigment ground in a varnish which dries fairly rapid and with a high gloss.

Q. Are enamels a considerable portion of the paint business?

A. They are.

Q. Is lithophone used with advantage and is it widely used in floor paints?

A. Lithophone is probably very widely used in floor paints with very great advantage.

Q. Can you give a reason for this?

A. Lithophone has two distinct qualities possessed by no other pigment. In the first place it is more inert than the majority of pigments and, in the second place, its particles are so exceptionally fine that they form in themselves a remarkable protection, particularly on a flat surface and it is for that reason that they are so well adapted to floor paints.

Q. In floor paints is there any special objection to carbon-
199 ate of lead or oxide of zinc?

A. There is no special objection to them.

Q. Is there a special advantage of lithophone over carbonate of lead or oxide of zinc in floor paints?

A. Oh, yes, there is a great advantage.

Q. Namely?

A. The fact of the indivisability of the pigment and the insolubility of the pigment and the hardness of the pigment, all of which advantages are contained in lithophone and are not possessed by the statutory pigments.

Q. Are there any other mixed paints in which lithophone is properly used and used with decided advantage?

A. There are many uses for lithophone in the paint industry, the making of interior paints, wall paints, wall enamels.

Q. How about window shades?

A. Oh, the technical uses of lithophone are very large; window shades, table oil cloth and floor oil cloth are three industries which virtually could not exist today without lithopone.

Q. Can you give us an approximation in dollars and cents or in gallons of the extent of the use of mixed paint containing lithophone for table oil cloths and linoleums; I suppose that is what you mean when you speak of floor oil cloth.

A. Floor oil cloth and linoleum are really two different things, but both industries use lithopone.

Q. And window shades?

A. I couldn't give the exact amount.

Q. Can you give it to us approximately?

A. There are today, I believe, 35 tons of lithopone made per day in the United States. There is also some imported, not a great deal. Now, that is divided between the three industries that I have mentioned and the paint industry.

200

Q. Can you nearly state the extent to which lithophone is used in the industries which you have mentioned by stating to us the relative amount of *m*inseed oil that is consumed in those industries in the manufacture of the paints wherein lithophone is used?

A. I have always understood that the leather, linoleum, oil cloth and allied industries consumed more linseed oil than the paint trades.

Q. Is lithophone the principal white pigment used in these trades which you mention?

A. In the majority of factories it is.

Q. And in your opinion properly so, Mr. Toch?

A. Oh, yes, certainly.

Q. What are the qualities of lithophone which make it especially useful in enamels?

A. Lithophone must be used in many enamels, owing to the fact that the statutory pigments combine with the varnish and form compounds which ultimately unfir the enamel for use. Lithophone, being a complete chemical compound, is not affected either by the acids in the linseed oil or by the resin acids in the varnish.

Q. Is varnish necessarily used in enamels?

A. Yes sir.

Q. What is the value of lithophone in enamels so far as gloss is concerned?

A. It produces a very high degree of gloss.

201 Q. Is that the desired quality in enamels?

A. That is the desired quality in enamels, yes sir.

Q. Has it that value to a greater extent then the statutory pigments?

A. It has that value to a greater extent than one of the statutory pigments.

Q. Than which one?

A. Carbonate of lead.

Q. How about the spreading quality of lithophone in enamels?

A. Why, I haven't made any experiments in that for the reason that it is never very much asked for.

Q. How about the value of lithophone in mixed paint as tending to keep the pigment in suspension in the oil?

A. Its specific gravity is such that it tends to suspend the paint much more readily than either of the statutory pigments.

Q. The specific gravity of lithophone, as compared with that of oxide of zinc is what?

A. Oxide of zinc, I believe, is plus 5 or 5.2 or running from 5.2 to 5.6 perhaps, and lithophone—I have examined a great many samples—would all be in the neighborhood of 4.3 to 4.6.

Q. And carbonate of lead has a still greater specific gravity than oxide of zinc?

A. Still greater.

Q. About 6.5?

A. It runs from 6.3 to 6.7, sometimes 6.8, I think.

Q. Notwithstanding its light specific gravity state whether or not lithophone is as or more opaque than the statutory pigments.

A. It is more opaque than zinc and probably as opaque

202 as lead.

Q. Is lithophone poisonous?

A. No sir.

Q. State whether or not there are certain shades of color desired and in demand which can be produced in mixed paint without using one or another or more of the Class B pigments?

A. There are a number of colors that could not be produced without them.

Q. You have in your hand a color card which contains the names arbitrarily given to the colors there shown, which I will introduce in evidence as an exhibit and to which I will now refer. (The paper was marked Complainants' Exhibit A.) Which of the colors shown on that color card come into that class?

A. Well, the primary colors, red, yellow, blue and green, cannot be made without the addition of a pigment in Class B.

Q. Will you please refer to the arbitrary names placed under the colors on that color card and name us the colors on that color card which could not be produced without Class B pigments being used in the mixed paint?

A. The vermillion, blue, myrtle green and crylight green.

Q. How about the bottle green in the first column?
A. The bottle green in the first column, yes.
Q. How about the golden olive, last but one in the second column?
A. Golden olive, and then leather brown, red brown, crimson and Tuscan maroon.
Q. How about the dark green, last but one in the last column?
A. That is another shade or color that could not be made
203 without using Class B pigments.
Q. Now will you please state the reason why?
A. These colors are all made of concentrated pigments and must have one of Class B in them to act as a carrier for the concentrated color.
Q. Do you mean to be understood that without the addition of pigments of Class B, there would not be sufficient consistency in the mixed paint?
A. Yes, that is right; there would not be sufficient consistency.
Q. Now, why couldn't you use the statutory pigments or Class A pigments for that purpose?
A. Well, if you were to put the statutory pigments into the blue or myrtle green, you would immediately obtain a different shade.
Q. How about the other colors that you have heretofore pointed out?
A. The same is true of all the colors that I have just mentioned.
Q. Do you mean to be understood as saying that the statutory and the Class A pigments would tend to modify the color so that you could not produce the color named there?
A. That is right.
Q. Now, in regard to the chemical effect of the statutory pigments upon some colors or coloring material in some mixed paints; tell us about that.
A. If you attempted to make the two colors here, or the three colors, turquois blue, sky-light blue and medium blue, by taking the Prussian blue and the statutory pigments, you would very soon have a green pigment in the tin which would then change to a pale blue on exposure to the air.
204 Q. What is that due to?
A. That is due to the reduction in the Prussian blue that is used. It is changed from a ferric to a ferrous state and back again into the ferric state when exposed to the air. In paints of these kinds one of the statutory pigments must be omitted.
Q. Only one?
A. White lead must be omitted.
Q. You could use the oxide of zinc?
A. You could use the oxide of zinc.
Q. Now, how about its effect upon the color?
A. The oxide of zinc would have no effect on the Prussian blue. If, on the other hand, you attempted to make these shades out of ultra-marine blue, you would have the opposite effect; the sulphur in the ultra-marine, attacking the lead, would change the paint into a dirty grayish brown.
Q. Mr. Toch, I understood you to say that oxide of zinc could be

used in certain blues which you have mentioned without attacking the chemical integrity of the Prussian blue or ultramarine blue; is that correct?

A. Yes sir.

Q. Now, take the colors which you heretofore have named and as to which you said the mixed paints of those colors cannot be made without the use of Class B pigments; could you, in those cases, use oxide of zinc or carbonate of lead without modifying the color?

A. You could not.

Q. Is Prussian blue and is ultramarine the coloring matter used to produce the three blues that you have mentioned?

A. They are.

205 Q. What other coloring matter is there upon whose chemical integrity carbonate of lead has an effect?

A. The greens; the Prussian blue and chrome yellow mixtures, known as chrome greens.

Q. In the case of the use of Prussian blue that you speak of suppose that you would add oxide of zinc, would you than have sufficient body in the mixed paint?

A. You would not.

Q. What then would be necessary?

A. You would have to add some other pigment.

Q. Of what class?

A. Of class A.

Q. Which ones of Class A?

A. Well, you could add a number of them. You could use lithophone and you could use zinc lead, sublimed lead or western zinc oxide.

Q. How about the Class B pigments, could they be used in that connection?

A. The Class B pigments, they would not add to the body.

Q. Not in that capacity?

A. Not in that capacity.

Q. Do you regard it as an important quality of the paint that after it has been on the surface long enough to require repainting, it should present a proper surface for repainting?

A. I do.

Q. How do carbonate of lead and oxide of zinc behave in that regard?

A. Carbonate of lead presents a filmy, absorbent and chalky surface on which it is very difficult and unadvisable to repaint, and zinc oxide presents a hard, in some cases vitreous and cracked surface, which is uneven and very difficult to remove.

Q. How can that be overcome?

206 A. By the use of materials, pigments of both Class A and Class B.

Q. Now, what is the action of the statutory pigments in regard to settling in the can?

A. The statutory pigments become eventually hard and unable to be stirred in the can, but particularly if there is a preponderance of the one over the other.

Q. What is the comparative quality of the other pigments that you have spoken of, say Class B, in respect to the settling propensity?

A. Well, any pigment in Class B excepting barytes will prevent the settling of the statutory pigments.

Q. Barytes you except on account of its high specific gravity?

A. High specific gravity, yes.

Q. Which pigment do you regard as especially valuable for the purpose of preventing settling in the can?

A. I do not favor any particular one. In the east——

Q. You mean over any other?

A. Over any other. Freight conditions have much to do with that.

Q. So far as the physical contact with floor paint is concerned, are carbonate of lead and oxide of zinc as pigments for floor paint especially susceptible to that influence, to the influence of physical contact?

A. They are.

Q. And are they or are they not susceptible to the influence of moisture when the surface is cleaned, scrubbed?

A. They are; they are more susceptible to moisture than any other pigments in either Class A or B.

Q. Mr. Toch, please state whether, if the supply of carbonate of lead and oxide of zinc were to give out absolutely, as good
207 paint could be made by using the materials in Class A and Class B and possibly some other materials in addition thereto, as can be made with the use of carbonate of lead and oxide of zinc.

A. Yes indeed.

Q. Is barytes an economical pigment, in the sense of cost, for a paint manufacturer to use in mixed paints?

A. No; I regard it as an expensive material.

Q. State the reason.

A. I had occasion to examine a paint not long ago which contained three pounds of barytes to the gallon of paint, and I found that the three pounds of barytes constituted only four per cent. of the total paint.

Q. What does that come from?

A. Its specific weight and ability to condense in the material.

Q. Are the pigments of Class A or Class B more readily or easily adulterated than the statutory pigments?

A. The pigments of Class A are not more easily adulterated.

Q. Are the pigments of Class B more readily adulterated than the statutory pigments?

A. No, they are not.

Q. Can you state why carbonate of lead is higher priced than sublimed lead, irrespective of the question of freight now?

A. Oh, I should say it was due to the fact that it is controlled by the trust.

Q. Which is controlled by a trust?

A. Carbonate of lead.

Q. What company controls that?

A. National Lead Company.

Q. Where does the oxide of zinc come from as distinguished from the western zinc?

A. The oxide of zinc that we all know all comes from New
208 Jersey, from the Franklinite mines.

Q. Are those mines controlled by one company?

A. By the New Jersey Zinc Company.

Q. So that there is practically a monopoly of New Jersey zinc, is there?

A. There is a monopoly of it.

Q. Has that, in your opinion, to do with the cost of the article?

A. Well, hardly. The zinc is sold in the east at a very fair price, not at a prohibitive price.

Q. Has the fact that zinc made from western ores would compete with the eastern zinc, if the eastern zinc were not kept down in price, something to do with that?

A. I believe it has.

Q. Do you regard the fact that you have nowadays the pigments in Class A as a factor in keeping down the price of the statutory pigments?

A. I believe that is so.

209 Cross-examination.

By Mr. WATSON:

Q. In your view, the competition which the New Jersey zinc meets with because of the production of western zinc causes the price to be kept down to a reasonable figure, although the New Jersey zinc is controlled by one company?

A. Well, that is merely my personal opinion.

Q. Well, that is your opinion, isn't it?

A. Well, I believe that they are. Even at times when they had no competition, they didn't take advantage of it.

Q. Well, do you recede from the opinion which you have given on your examination in chief, that that is the reason why eastern zinc is kept down to a fair price?

A. I say that such is mu opinion and I still believe that; I still hold that.

Q. But when it comes to carbonate of lead, then you say the price is kept up by the trust which controls it; that is your opinion, is it?

A. That is my opinion too.

Q. Well, doesn't carbonate of lead come into competition with sublimed lead?

A. To some extent it does, yes.

Q. Haven't you just been testifying that, in your opinion, the sublimed lead is for most purposes the superior article?

A. Yes.

Q. Then how do you explain the fact that, being a superior article and better in your opinion than the carbonate of lead, the competition which thus results has no effect upon the price of the carbonate of lead?

A. Well, there are trade conditions there which we are
210 able to oversome. For instance, if the price of dry carbonate of lead were raised to ten cents tomorrow, I would be able to make paint just the same and perhaps have sufficient ability to turn around and mix other materials so as to enable me not to use lead at all; and if the reverse were the case, I would do the reverse.

Q. Do you think that the existence of a general prejudice all over the world in favor of carbonate of lead as opposed to sublime lead has anything to do with keeping up the price?

Mr. ZEISLER: I object to that question as assuming a condition of facts not borne out by any evidence.

A. I do not.

Q. You would attribute the fact that the price is kept up as you have already stated to the control of the commodity by the National Lead Company?

A. By the National Lead Company.

Q. That would be true, would it?

A. Yes.

Q. And the operation of the principle of competition which applies in respect of zinc does not apply in the case of leads?

A. It does not.

Q. What is your age, Mr. Toch?

A. 41.

Q. You are a manufacturer of paint, you say?

A. Yes sir.

Q. Under the firm name of Toch Bros.?

A. Toch Bros.

Q. Where is your factory located?

A. In Long Island City.

Q. Is anyone except your brother interested with yourself in the business?

A. No one else.

Q. When did you commence the manufacture of mixed paints, in what year?

211 A. Well, our business was founded in 1848, and I am one of the second generation.

Q. When did you become interested in it?

A. Almost from the time that I started, 19 years ago.

Q. How many men are employed in your factory?

A. 22.

Q. Your monthly product, you say, or output is about twenty or twenty-five thousand dollars?

A. Sometimes it would run over that.

Q. Well, it averages about that, does it?

A. Averages about that, yes.

Q. And your paints are not sold out in the west here at all?

A. They are not.

Q. You find a market for them in New England and the East?

A. No, we find a market for them in various parts of the United States and in Europe and South America.

Q. But not west of the Mississippi River?

A. Not west of the Mississippi, no.

Q. Do you use any carbonate of lead or oxide of zinc in the manufacture of your mixed paints?

A. I do.

Q. I understand you, however, to say that if, for any reason, the production of carbonate of lead and oxide of zinc entirely ceased, that you could make just as good, if not a better paint out of the pigments mentioned in Schedules A and B; that was your answer, was it not?

A. Yes sir.

Q. Now, that being true, you still find it necessary and advisable to use these statutory pigments, do you?

A. But——

212 Q. No, you need not make your explanation; I will get to that later. You still find it necessary to use them?

A. I cannot answer unless you permit me to explain. We are not general mixed paint manufacturers.

Q. You are not engaged in paint manufacturing, and yet you make an enormous quantity of mixed paints?

A. Those are technical paints that we make for technical purposes and not paints put up in small packages and small tin cans and sold to jobbers.

Q. Then as I understand it, while you are manufacturers of paint, the products of your factory are not designated for general commercial use like the painting of the outside of buildings?

A. Oh, yes, they are.

Q. Well, what sort of paints are they? I thought you said they were designed for special purposes.

A. If you wanted to paint a new brick wall, you would not buy the average mixed paint for that purpose. Or if you wanted to paint a structural steel bridge you would not use general mixed paints made of the statutory pigments.

Q. Well, when you said that, if the production of the statutory pigments entirely ceased you could make a better paint with these substitutes—you said that, did you not?

A. I did, sir.

Q. Now, these substitutes are all on the market, aren't they, in New York? You can find all of these articles that are described in A and B in New York, can't you?

A. No, I don't think so.

213 Q. You don't think so?

A. No, I don't think so. I don't think we ever has any western oxide of zinc or leaded zinc in the East.

Q. Well, now, name any others that are not commonly found in the markets of New York, of those described in A and B.

A. All in Class B are found, and the one that I have never heard of in the East as being a marketable article is zinc containing lead from western ores.

Q. Then with that one exception, all of these pigments are found upon the market in New York?

A. Yes sir.
Q. Now sublimed lead, of course, is found there, is it not?
A. Yes sir.
Q. And is it not cheaper in price than either carbonate of lead or oxide of zinc?
A. Why, no, it is dearer.
Q. In the New York markets?
A. Yes sir.
Q. According to your quotations, according to the drug journals?
A. Oh, I wouldn't go by the drug journals; I go by bills which I check myself.
Q. Well, is it not quoted in the drug journals at jobbing prices at which it can be purchased by any one on the market?
A. I see in the bulletin that such is the case; I have never looked it up, but, if it is, it is erroneous.
Q. If the trade journals which publish these market reports in regard to these different pigments, the trade journals that are published in New York, if they should show that sublimed lead can be bought of jobbers at a cheaper rate than the carbonate of
214 lead, that would be a mistake, would it?
A. Naturally.
Q. It would be a mistake. And if they should show that it could be bought at a cheaper price than oxide of zinc, would that also be a mistake?
A. That would be a mistake too.
Q. Both be a mistake. Do you know anything about the Philadelphia Price List published at Philadelphia?
A. No sir, I never consulted a trade paper for a quotation in my life.
Q. Do you know anything about a paper published in Philadelphia called Drugs, Oils and Paints?
A. I know that there is such a paper.
Q. You know Mr. Heckel, don't you?
A. Yes.
Q. Well, he is the secretary of the Paint Manufacturers' Association, isn't he?
A. Yes sir.
Q. And you belong to that association?
A. I do, sir.
Q. You know Mr. Heckel very well?
A. I know him very well.
Q. And he is the editor of this paper, Drugs, Oils and Paints is he not?
A. Well, so I have been told. I only knew that last year.
Q. Well, you know it now, don't you?
A. I do, yes sir.
Q. I will ask you if there is a great jobbing industry in the matter of the ingredients of paint carried on in Philadelphia.
A. There is, yes sir.
Q. And it divides almost equally with New York importance as a

center for the distribution and sale and jobbing in these pigments, does it not?

A. I believe it does.

Q. Now, in the publication of Drugs, Oils and Paints for
215 November, 1905, the price of American White Lead dry is given in that journal at 6½ to 7 cents per pound.

Mr. ZEISLER: Pardon me, Mr. Watson, but why do you omit the words "in barrels"?

Q. Well, in barrels: American White Lead dry in barrels, 6½ to 7 cents per pound. Is that about what the ruling price was at that time?

A. In barrels, yes. That would mean in single barrels.

Q. Now the price of sublimed white lead in carload lots at the same time appears to have been, in the Philadelphia market, five cents per pound; is that what you understand the price was?

A. I did not.

Q. You did not?

A. I did not.

Q. Then if this journal, edited by the secretary of your paint association, has given those as the current quotations, he is in some error, is he, in regard to it?

A. He is, and I think I could explain that.

Q. Well, you think he is in error about it, to start with, do you?

A. He is in error in regard to the price of sublimed white lead.

Q. Now, as a matter of fact, if sublimed white lead could be purchased at that time at five cents a pound at Philadelphia, it could have been purchased at the same price in New York, couldn't it?

A. I think so.

Q. There is no difference between the jobbing prices of these two articles in these two cities at a given time?

216 A. I don't think so.

Q. And if sublimed white lead had been on the market in New York in November last at five cents a pound, you would have used it in all cases in your factory where you would otherwise employ white lead and zinc, would you not?

A. Where I had the privilege to use it, I certainly should have used it.

Q. I am saying if the price would have been as I have mentioned, you would have used sublimed white lead entirely instead of white lead and zinc in your own factory, would you not?

A. I certainly should.

Q. Then the reason this past fall you have not entirely discarded white lead and zinc in your own factory was because you did not know and do not now believe that there was this difference of a cent and a half to two cents per pound between the price of the two articles?

A. That is practically so, excepting before you said I would not substitute sublimed white lead for dry white lead or carbonate of lead, but in your last answer you included zinc in that. I wish you would please modify that.

Q. Well, you have modified it; that is sufficient. Your answer applies simply to the substitution of sublimed white lead for the carbonate of lead?

A. My answer applies simply to the substitution of sublimed white lead for the carbonate of lead, yes sir.

Q. Do you find that sublimed white lead is generally used in the manufacture or preparation of mixed paints?

217 A. It is very largely used.

Q. Will you tell us which one of the complainants in this case employs sublimed white lead in the manufacture of mixed paints?

A. Which one of these use white lead? I do not.

Q. You cannot point out any one of the complainants who use, in the manufacture of mixed paints, sublimed white lead?

A. Not unless I have their paints and analyze them.

Q. How much of this sublimed lead is produced annually in the United States?

A. Oh, I am informed about between seven and eight thousand tons.

Q. What percentage is that of the production of lead carbonate?

A. I don't know the statistics in regard to lead carbonate.

Q. Well, don't you know it is not more than about five per cent. of the production of lead carbonate?

A. I understood, though, about nearly twenty.

Q. Nearly 20?

A. So I understood.

Q. Is there any uniformity in sublimed white lead as to its composition?

A. I found it to be quite uniform.

Q. Then you don't agree with Prof. Hurst in his statement that it lacks uniformity?

A. Where does he say that please?

Q. I read from the bottom of Page 53 of the third edition of Prof. Hurst's work on "Painters' Colors, Oils and Varnishes":

"It (sublimed white lead) in composition is very variable. Much depends upon the ore from which it is made and whether anything has been added to it after the pigment was made in the furnaces described above. The following analyses are partly from

218 published accounts and partly from the author's own results:

Lead sulphate $PbSO_4$	70	82.390	per cent.
Lead oxide, PbO	23	0.554	"
Zinc oxide ZnO	7	6.335	"
Lead carbonate, $PbCO_3$	..	9.421	"
Water, Hygroscopic	..	0.350	"
Water, combined	..	1.050	"

Then I understand you entirely disagree with Prof. Hurst as to this being a very variable pigment in the matter of its composition or constituent elements?

A. I do.

Q. And when he says that the lead sulphate varies from 70 to 82 per cent., you do not agree with him?

A. Well, such has not been my experience.

Q. It always has not been your experience that the lead oxide varies all the way from 23 per cent. to a trifle more than a half of one per cent?

A. No sir, I never saw a sample that——

Q. And it has not been your experience that in some cases there is an entire absence of lead carbonate, $PbCO_3$, and in others that it is present to the extent of more than nine per cent. of the entire substance?

A. I never came across that.

Q. You know something of this work of George H. Hurst, do you not?

A. I don't know about that particular edition; I do about the previous edition.

Q. Do you know that Mr. Hurst is considered the greatest English authority upon the subject?

A. I would consider Prof. Hurst a fair authority on the subject.

Q. You would not rank him, however, at the top of our English chemists upon this subject as an authority?

219 A. I do not know of any English chemist at present who is better than he is, but the English methods are different from ours.

Q. Then you would concede him first running among the English chemists but not in the same rank with an American chemist, is that your idea?

A. That is my idea.

Q. You say that white lead is an unstable element?

A. Yes sir.

Q. It is, however, the oldest of all pigments, it is not?

A. Yes sir.

Q. And has been in use since the beginning of the Christian era or before that time?

A. The Romans used mineral native carbonate of lead.

Q. And, as you have already said, it has, through all the centuries which have come and gone since that time, been in use and down to the present time is the most generally used pigment, is it not?

A. That, I believe, is correct.

Q. And it also is the highest priced, of course, of any of these pigments?

A. That is true, too.

Q. Possesses the greatest commercial value?

A. It does.

Q. And it has more general recognition, I suppose, the world over, than any other pigment, has it not?

A. I think excepting France and Germany.

Q. And in France and Germany that is not true? It is true except in those two countries?

A. In France, I believe, it is illegal to use lead, for government work anyway.

220 Q. Because of its poisonous qualities?

A. Because of its noxious qualities.

Q. Now, while you have expressed the opinion, Mr. Toch, that a better and more valuable paint can be made from the pigments in Classes A and B than from the statutory pigments, you would not claim that that is an opinion which is universally or even generally held among paint manufacturers, would you?

A. I would, among those paint manufacturers who know their business, I would expect that.

Q. Are there not a large number of paint manufacturers who content that the statutory pigments are the only proper ones, the only satisfactory ones to be used in the manufacture of paint?

A. There may be some who content that.

Q. Are there not large manufacturers of paints at this time who do not use any of these substitutes described in A and B, but who practically or substantially make their paints out of the statutory pigments?

A. Not a majority that I know of.

Q. I didn't ask about the majority; I asked you if there were not a considerable number.

A. I wouldn't even say a considerable number, because there are only perhaps one hundred recognized or large paint manufacturers, mixed paint manufacturers, in the United States; I don't think there are any more; and out of that one hundred I am quite sure that not the majority uses statutory pigments.

Q. Do you classify the output of your factory as one of the one hundred leading manufacturers of the United States?

221 A. I would not, no.

Q. Then your factory does not fall in that class?

A. I don't think we are large enough.

Q. How great a production must a factory have in order to be included in this class of one hundred to which you allude?

A. Oh, I think at least 100,000 fallons per year of mixed paint.

Q. Now, you say you do not believe a majority of these 100 of the leading or largest manufacturers of paint use only the statutory pigments in the manufacture of mixed paints; is that what I understood you to say?

A. That is correct.

Q. Well, then, in your opinion would the number be about equally divided, would there be about one-half of that one hundred who would use only the statutory pigments and the other half using either the statutory pigments or those mentioned in A and B in composition therewith?

A. Not having tabulated it, I would prefer not to give an exact answer. I really do not know the number.

Q. Well, as nearly as you are able to tell us, will you tell us?

A. As nearly as I am able to tell you, it is simply that I meet the paint manufacturers and am frequently asked and know their formulas, know the formulas of many of them and I understand that today this man would use zinc lead, another man would use sublimed lead, a third man would use zinc oxide and barytes, and a

fourth man would use the statutory pigments plus barytes or plus magnesium silicate, and so on, so that I have never yet found
222 any two to make identically the same thing.

Q. The manufacturer who confines himself to the statutory pigments—they being, as I understand you about fifty per cent. of these one hundred large manufacturers—would contend just as strongly that the statutory pigments were the only proper ones as you would contend that it is permissible to use these others without destroying or impairing the usefulness of the paint?

A. I suppose they would say that.

Q. There would be this well-defined cleavage of opinion, and it does exist today between the manufacturers, does it not, on that subject?

A. It does.

Q. And it is not a settled question at all so far as the manufacturers are concerned as to the usefulness or efficiency as substitutes of these pigments mentioned in A and B over the statutory pigments?

A. That is very true. On the other hand, fifteen or twenty years ago there were a greater number who believed in the statutory pigments and, as we go along, we learn and progress. There are some paint manufacturers who probably are not as progressive as others and they have not altered their methods.

Q. And out of this kind you think that about fifty per cent. of this total of one hundred large manufacturers are convinced that it is proper and all right to use as substitutes the pigments mentioned in A and B?

A. Oh, the question of fifty per cent. is merely a guess.

Q. However, it is your best guess?

A. It is my opinion that probably that may be it more or
223 less.

Q. The pigments that are described in A and B have practically all come into use within the last fifteen or twenty years, Mr. Toch?

A. No, I should say that zinc oxide, the western zinc oxide, must be older than that; and the sublimed lead and zinc lead, I do not believe are so old; and lithophone dates back to 1884, its proper name is Orr's White; Charles B. Orr is the inventor or discoverer of it; that is twenty-two years. And of Class B barytes is, well, as old as creation. I don't know how long it has been used in the paint trade, but probably before any one of us were born. Silica is also very old. Magnesium silicate has, well, in one form or another, has been used for a number of years in the paint trade, probably fifteen or twenty. Calcium sulphate or gypsum, that is likewise an old material. Calcium carbonate, whiting, has been used way back centuries ago.

Q. Of course, all of these pigments named in A and B are, as a rule, much cheaper commercially than the statutory pigments, are they not?

A. No sir.

Q. Well, the great bulk of them are?

A. Well, but you cannot class A and B together and compare it to the statutory pigments.

Q. No, I understand that. You do not claim, of course, that these substitutes, or at least a great majority of them, can be used in any other quantity than some limited or given per cent. without very materially impairing the quality of the paint, do you?

224 A. Which class do you refer to?

Q. In A and B.

A. Why, no. Class A could be used by itself, almost any one of them, and a good paint made. Class B would serve a different physical purpose.

Q. You said that silica, I think, could not be used safely to a greater extent than——

A. Than one-third.

Q. Now what extent would you consider that calcium carbonate might be used without greatly deteriorating the value of the paint?

A. Calcium carbonate I have no experience with in house paints. I use it on principle. I use five per cent. on principle in every structural iron paint that we make.

Q. You consider five per cent. as the outside limit of all that ought to be used?

A. Oh, no, I don't. I use five per cent. to take care of any free acid that might exist in the oil or in the pigment?

Q. Suppose there are none of these acids or only a trace of them?

A. I take no chances; I put five per cent. in that anyway.

Q. Well, that helps to make up the quantity?

A. Yes sir.

Q. And in that case, there being no acid and therefore no requirement for it in that particular as a chemical ingredient, the manufacturer would save the difference between the cost of this calcium carbonate and that for which he used it as a substitute?

A. Well, that would be such a small fraction probably of one per cent. of the cost that if you were to reduce the paint in barrels one-half per cent. per gallon, it would cut no figure.

225 Q. But on a large production it would make considerable figure, wouldn't it?

A. That depends; these materials in Class B do not always add bulk.

Q. No, barytes does not, I believe.

A. No, and silica, many forms of silica do not add bulk.

Q. I understood you to say that it was not objectionable to use a paint in which lithopone was an ingredient?

A. That is the first coat.

Q. When used as a first coat; that was right, was it?

A. Yes sir.

Q. Well, then, to make it practical to use such paint, in painting a house, for instance, it would be necessary under those circumstances to get two qualities of paint, would it, one containing lithophone and one in which there was no lithophone?

A. That has a large practice in the east.

Q. Well, I ask you if that would be true.

A. Oh, yes, that would be good for the house all right.

Q. Did I understand you to say that it was problematical if lithophone adds to the value of paint?

A. I meant it was a problem which I had not worked out. I knew about its value in the arts for manufacturing certain materials, knew about its value as an enamel, a pigment in an enamel, but I did not know, I had not sufficiently worked out its value as compared with some of the materials in Class A.

Q. You use it quite extensively in your factory, do you?

A. I use it very largely.

226 Q. Now, in lieu of what other pigment do you employ it?

A. In lieu of no other; there is no other that would answer for that for the particular case in which I use it.

Q. Well, if you did not employ the lithophone as a pigment, what other would you be obliged to *yse* or would you use?

A. I couldn't; I couldn't make the material that I am now making.

Q. What is that material?

A. That is a peculiar acid resin, a compound that is sold for a particular purpose in which any other material would combine and solidify, whereas lithopone does not.

Q. What kind of work is done with that material or paint?

A. I own the patents on it, but it is used entirely for protecting the floors of dynamo buildings or buildings where electricity is generated, to protect those floors from abrasion and against the liberation of silica and lime from cement through attrition.

Q. That is a very limited and circumscribed use and a very little paint would be needed to supply the paint for such purposes as that?

A. I hope not; I look forward for a very great use of that.

Q. Well, I say at the present time?

A. Well, the paint is only a year old but a fair quantity of it has been sold.

Q. You do not state such a circumstance as that as being one by which you could judge of the necessity of the use of lithophone generally existing in the manufacture of mixed paints, do

227 you?

A. I certainly do.

Q. And from that you draw a conclusion that the use of lithophone as a pigment or ingredient of mixed paint is a necessary one?

A. Its use must necessarily increase on account of its inherent qualities.

Q. Now, you spoke of the use of lithophone in the preparation of enamel paint, did you not?

A. Yes sir.

Q. And you said it possessed a very high glossy appearance, that is, it gave a glossy appearance?

A. It aided in the gloss of the enamel, yes.

Q. Yes, and it gave that result?

A. Yes sir.

Q. And you said that this result would not be obtained by the use of carbonate of lead?

A. No.

Q. It would be obtained, however, by the use of oxide of zinc, wouldn't it?

A. Oh, no; that would depend very largely. Most of the varnishes from which enamels are made are organic acids and they combine not readily with zinc, but after a lapse of time and where enamels are sold and made entirely of zinc and acid resins and sent to a great distance, after a lapse of time a combination takes place which absolutely spoils the enamels; it thickens it so that it is useless.

Q. Oh, yes, I suppose if any paint gets too old it loses many of its good qualities.

A. This is not too old; this is within a limited time.

Q. Isn't it a matter of fact that oxide of zinc is commonly used for giving this high gloss or polish to enamel paint and is
228 used in the last coat that is put upon finishing a piece of enamel paint; isn't that true?

A. No sir, not exactly, it is only partly true. Oxide of zinc is added to enamels partially to make the enamel, but you could not enamel only, for instance, with oxide of zinc.

Q. You mean that the lithophone is a necessary ingredient, an absolutely essential ingredient to give it that glass?

A. No sir.

Q. It is simply useful for that purpose?

A. It is valuable.

Q. And before lithophone was used they were able to produce these effects, were they not, in the form of a fine high gloss on an enamel painting or finish?

A. Oh, yes, but that was not done in the same way as it is now.

Mr. ZEISLER: Explain what you mean.

The WITNESS: Well, ready for use enamels were not sold twenty-five years ago.

Q. Now, you stated, in referring to Exhibit A, that a number of the colors which appear thereon could not be produced by the use of the statutory pigments and without the aid of some of the ingredients mentioned in B, was that your testimony?

A. That was correct.

Q. Now, as a matter of fact, is it not true that these manufacturers of paints who cling to the statutory pigments put out mixed pains which show as wide a range in tints and colors as those which appear upon Exhibit A, and that they produce them without the use of any of the ingredients described in B; is that not true?

A. All the colors you mean?

229 Q. Well, I have asked covering as wide a range of colors as I could.

A. Well, that could not include all the colors.

Q. That is, it could not be true of the exact tints which are shown upon this Exhibit A?

A. Very naturally not.

Q. Well, all these other manufacturers who cling to the old pig-

ments which we style statutory here would claim upon the stand that they could produce just as great a variety of tints and colors without the aid of these pigments described in B as you claim to produce with them, would they not?

Mr. ZEISLER: Objected to as immaterial and incompetent.

A. You say that a manufacturer would claim that he could make a vermilion out of the statutory pigments exactly as it is on the color card there? He would have to be a magician.

Q. Well, is it not true that there is just as great a controversy and just as great a lack of agreement amongst large paint manufacturers as to their ability to produce this entire range of colors with or without the use of the ingredients described in B?

A. No sir, there is no such controversy among them.

Q. There is not?

A. No sir.

Q. And I would not be able to exhibit to the court in this case a range of colors which at least are claimed to be produced by some of these large manufacturers without the use of the ingredients described in B; you think I could not do that, do you?

A. Your question, as I understood it, was that these colors could all be made with the statutory pigments, and I claim it is impossible; a man cannot do it.

230 Q. I didn't put the question that way exactly. I asked you if reputable manufacturers would not claim to produce just as wide a range of tints and colors as *atr* shown here and do it without the use of the pigments shown in B.

Mr. ZEISLER: Objected to as immaterial and incompetent.

A. I don't think a reputable manufacturer would claim that.

231 Redirect examination.

By Mr. GEISLER:

Q. State whether or not there was a time when carbonate of lead was the only opaque white pigment known and in use.

A. There was.

Q. How long is it since oxide of zinc has come to be recognized as an opaque white pigment?

A. Oh, not over twenty years.

Q. Prior to the time that oxide of zinc became generally recognized as a useful opaque white pigment, the manufacturers of paint clung to the idea, did they not, that carbonate of lead was the only white opaque pigment properly usable?

Mr. WATSON: Objected to as leading.

Q. State whether or not that is true.

A. They had no other white material excepting white lead; they had to use it.

Q. But from the time that oxide of zinc first was introduced to the time when it became generally recognized as a proper opaque white

pigment, is it not true that a number of manufacturers of paint clung to carbonate of lead as the one proper opaque white pigment?

A. If I am correctly informed, it took about thirty years to introduce oxide of zinc to the commercial world as a paint pigment.

Q. And until it was and became generally recognized, state whether or not there was a prejudice in favor of carbonate of lead and against oxide of zinc to which some manufacturers continued to cling?

A. I can safely state that that was the case, even with my
232 father who was a paint manufacturer, in a very small way, as far back as 1848.

Q. State whether or not there is a difference in principle between the prejudice that existed for a long time against oxide of zinc until it became generally recognized and the prejudice to which now some manufacturers continue to cling in favor of the statutory pigments as against other pigmentz.

A. History repeats itself.

Q. Did you mean to be understood as saying that one-half of the leading manufacturers of paint in the United States cling to the prejudice in favor of carbonate of lead and oxide of zinc to the exclusion of all other white pigments both of class A and Class B?

A. I did not. I said, or intended to convey, that fifty per cent. more or less of the paint manufacturers used materials in Class A and B; I do not pretend to know what the others use; I only speak about those of whom I know.

Q. Then, if I understand you correctly, you mean to say that approximately half of the leading manufacturers of the United States to your knowledge use other pigments than the statutory pigments, either in the place thereof or in connection therewith; is that correct?

A. That is correct.

Q. But you will not say, will you, Mr. Toch, that the other half absolutely exclude all of the pigments of Class A and B?

Mr. WATSON: Objected to as leading and improper.

A. I do not.

Q. State whether or not you have any knowledge which would enable you to say that one-half of the leading paint manufac-
233 turers of the United States exclude all pigments of Class A and Class B?

A. I certainly could not state that. I have every reason to believe that every manufacturer, with a few possible exceptions, uses some material in Class A and Class B.

Q. Now, when you speak of some people clinging to carbonate of lead and oxide of zinc, state whether or not you mean that they cling to those pigments where opaque white pigments are desired and necessary.

Mr. WATSON: Objected to as leading.

A. Not necessarily.

Q. Would the manufacturers who tenaciously hold to their preju-

dice in favor of carbonate of lead and oxide of zinc exclude the Class B pigments if they desired to produce the shades of colors on Exhibit A which you pointed out in your direct examination?

A. They would not.

Q. Do you mean to say that a manufacturer clinging to the statutory pigments could produce the greens, the vermilions, the Tuscan reds, without adding some of the Class B pigments?

A. They could not make it with the statutory pigments.

Q. He would have to exclude the statutory pigments?

A. Exactly.

Q. And would he have to use some of the Class B pigments?

A. He would.

Q. Could any manufacturer make all desirable shades of paint on all the shades of paint in demand, using only the statutory pigments?

A. That would be impossible.

234 Q. Then when you referred to a possible fifty per cent. of the leading paint manufacturers of the United States who, for all you know to the contrary, cling to their prejudice in favor of carbonate of lead and oxide of zinc, you have reference only to whites and certain shades of tints?

A. I have.

Q. Have you ever sought a market for your goods in the west?

A. We have not.

Q. Referring to the price list in the bulletin heretofore referred to, purporting to be taken from the November, 1905, number of Drugs, Oils and Paints, we find there that the price per pound for American white lead dry is given as applying to barrels. Did I understand you so say, in answer to Mr. Watson, that that means as to single barrels?

A. It is from one to five barrels that would mean.

Q. Now, that is the jobbing price, is it?

A. That is the jobbing price.

Q. We find that the price per pound as referring to sublimed white lead is given per carload?

A. Yes sir.

Q. Is that a jobbing price?

A. I don't know what price that is; I have characterized that as an error. I have never been quoted any such figure.

Q. Would the price per pound in carload lots be the same as the price per pound in barrel lots?

A. No sir, the price in carload lots would be much lower.

Q. Isn't this true, Mr. Toch, that a man who buys carload lots can make a contract directly with the manufacturer, whereas

235 the man who buys in barrel lots must buy from the jobber who in turn has contracted for the article with the manufacturer and therefore must make the middleman's profit?

A. That is usually the custom.

Q. When you said that lead was prohibited in Germany and France by reason of its poisonous character, you referred to carbonate of lead, did you not?

A. Lead is not prohibited in Germany; it is only prohibited on some government work in France. It is not used in Germany on account of the qualities possessed there by the German lithophone, which is lower in price and of greater advantage.

Q. But you referred to carbonate of lead?

A. I referred to carbonate of lead.

Q. Now, you stated that you were not acquainted with the third edition of George H. Hurst's work, but with the second edition?

A. Yes sir.

Q. Do you know the date of the publication of the second edition?

A. I do not.

Q. The third edition, I find from the book used by Mr. Watson in his examination, was published in August, 1901. Your edition was published several years previous to that, was it not?

A. Well, I think it was a good many years ago.

Q. I will ask you to read with me the prefatory note to the third edition and, after I have read it, state whether I correctly have quoted it. It is this: "Advantage has been taken of the demand for a third edition of this book to add to it in several places, with a view
236 of bringing the subject matter up to date. Otherwise no material alterations have been made compared with the second edition, it being evident that the plan on which the book has been written is one which has met with favor from its readers and critics."

A. You quoted that correctly.

Q. I wish you would read the passage heretofore quoted by Mr. Watson from page 53 and the upper half of page 54, and, after reading it, state whether anything is therein contained which would lead you to judge that the analyses of sublimed white lead there given were made subsequent to the second edition of this work?

A. I should say that Prof. Hurst was not very particular with what he wrote in regard to sublimed white lead. If this is contained in his previous edition, I surely overlooked it.

Q. Well, would you, from reading of the passage that I called your attention to, judge that the analyses there given were made since the second edition?

A. Why, it looks to me as if they may have been made very long ago and rather—one of these samples must have been a very uncertain or unfair sample. The material, owing to its condition, the condition under which it is made and the temperature at which it is made, should contain absolutely no water. You could not get any water at a temperature of anywhere about between 400 and 1700 degrees, and yet there was between one and three tenths per cent. of water in these results here.

Q. Now, from the reading of the analyses by Mr. Watson, I
237 was led to believe that there might have been a half a dozen different samples of sublimed lead analyzed by Prof. Hurst? Is it not a fact that Hurst gives only the analyses of two samples of sublimed white lead?

A. That is all.

Q. And one of these contains, or did contain 70 per cent. of lead sulphate, 23 per cent. of lead oxide and 7 per cent. of zinc oxide, and

nothing else; and the other contained a little more than 82 per cent. of lead sulphate, a little over six per cent. of zinc oxide and the balance was made up of a small amount of lead oxide, of some lead carbonate (a little over 9 per cent.) and a very small amount of water and a little over one per cent. of combined water. That is correct?

A. That is correct.

Q. From your knowledge of sublimed white lead, could any such analyses have resulted from an examination of sublimed white lead made within the last two or three years?

A. No sir.

Q. Could it have been the result of the examination of a sample produced within the last five years, from your knowledge?

A. Not to my knowledge.

Q. Is it not a fact that the manufacture of sublimed white lead has made rapid strides and material progress within the last five years?

Mr. WATSON: Objected to as leading.

Q. State whether or not, within the last five years, the manufacture of sublimed white lead has made rapid strides and material progress.

A. The history of all chemical industries is virtually the same. No man ever succeeds at the very outset with his material,
238 and even though he is fairly successful in turning our a material, he is continually able to improve it. And such also as the history of the zinc oxide material in this country.

Q. How about sublimed white lead?

A. Referring to sublimed white lead, improvements are continually being made, the same as have been made in almost all chemical industries.

Q. State whether or not you have made analyses of a sufficient number of samples of sublimed white lead within the last five years to enable you to state definitely regarding the variability of the composition of sublimed white lead.

A. I personally haven't made any in five years. At our laboratory, I believe we made two or three and found them to be if my memory serves me rightly—we had three packages to draw from and found them all three identical.

Q. Were they examined about the same time or at different times?

A. Examined all at the same time.

Q. But they were from different lots?

A. That I don't know.

Mr. WATSON: I move to strike out the testimony as to the invariable character of sublimed white lead tested by the witness and just referred to, for the reason that it does not appear but what they all came from the same lot of material, and that such evidence does not tend to show any uniformity or lack of variance.

Q. How many samples of mixed paints have you examined within the last five years which contained sublimed white lead?

A. None.

239 Q. Either yourself or under your supervision, I mean.

A. Well, I don't know how many were examined at our laboratory in the paint department, but my interest is chiefly in technical paints so I do not look for paint that contains sublimed white lead or the statutory pigments.

Q. I understood you to say, on your direct examination, Mr. Toch, that you had examined many samples of paint containing sublimed white lead; did I correctly understand you?

A. Yes sir.

Q. Within what time have you made those examinations?

A. Well, that has been done within the last ten years.

Q. Also within the last five years?

A. Oh, yes.

QQ. Then when you said no to my previous question, it was because I limited my question to mixed paints; do I understand you rightly?

A. Exactly. I understood you to refer to mixed white paints.

Q. No, I didn't say mixed white paints, I said mixed paints.

A. Well, I understood you so, and that is why my answer was as it was.

Q. And did you examine mixed paints other than white, containing sublimed white lead, within the last five years?

A. Yes sir.

Q. A good many samples?

A. Oh, not very many.

Q. Was your examination of such a character that you could detect the composition of the sublimed white lead in the mixture?

A. As a report is handed to me, I am usually able to judge

240 what the synthesis of the paint is.

Q. What did you find as to the composition of sublimed white lead in those samples, as to whether they were uniform or practically so or not?

A. Well, they would have to be uniform to enable me to determine that it was sublimed white lead, because the result would usually show a figure of 17-20 or something of that sort, 17 of oxy-sulphate and 20 of lead oxide. Zinc oxide is very small usually; and we have a very good way of determining that fairly in our laboratory, so I know at a glance whether it is sublimed lead or standard zinc lead.

241 Recross-examination.

By Mr. WATSON:

Q. You say that oxide of zinc has been in general use as a pigment in the manufacture or preparation of paint for about thirty years?

A. For longer than that.

Q. Longer than thirty years?

A. Yes sir.

Q. And its value as a pigment became well established and universally recognized about thirty years ago?

A. That, of course, I am only speaking from hearsay; it wouldn't amount to anything.

Q. Well, you are an educated man in chemistry and on the subject of paints; you have studied and read up on this subject all your life?

A. I have.

Q. Well, employing your best knowledge as an expert, as you have presented yourself to us here today, tell us how long it is since oxide of zinc has received general recognition as a valuable pigment in the manufacture of paint.

A. About thirty years.

Q. Now, prior to that time it was in a condition where people didn't know what the ultimate outcome would be as to its value, was it?

A. No.

Q. Did it undergo a period of uncertainty as to its value?

A. No; it underwent a period of uncertainty as to its composition and color.

Q. Did it take a number of years to test its durability, its staying qualities, its value, its life?

A. That had been previously done in France.

242 Q. Well, you can't tell about the durability or life of any of these new materials until they have been used for a series of years?

A. That is true.

Q. You have already stated, in answer to Mr. Zeisler's question, that it requires time and use under varying conditions, to demonstrate the value of any of these new materials?

A. Yes sir.

Q. It took time to demonstrate the value of oxide of zinc, didn't it?

A. It did.

Q. Before it was generally recognized?

A. Yes.

Q. And it likewise will require time to demonstrate to the general satisfaction, or to the satisfaction of the trade generally, the value of many of these new articles which are contained in A and B, will it not?

A. It will.

Q. Now, some of these ores produced from the western mines you don't know anything about yet, do you? You said you have not used them down east?

A. Oh, I have used them in an investigating way and I feel I know something as to their merits.

Q. But a good many of them are so new in the world of commerce that their values are not generally recognized or known yet, are they?

A. Not a good many. I don't classify the paint materials in Class A as being new.

Q. Well, you would a good many of those in Class B, wouldn't you?

A. Class B are almost all older than Class A.

Q. Well, you take sublimed lead and you say that as it is
243 produced now, it is very much better and more even than it was originally produced; is that what you say?

A. Yes sir.

Q. And I understood you to say, in answer to a question of Mr. Zeisler, that its qualities and usefulness for the purpose of paint had been very greatly increased for the past five years.

A. Yes sir.

Q. Was that true?

A. That was true.

Q. And it is an evolutionary process of development, is it, from a material of ordinary value to one of greater value?

A. Yes sir.

Q. That is what you mean, is it?

A. That is exactly what I mean.

Q. And this process, in your opinion, is increasing its value from time to time or year to year?

A. Naturally.

Q. The state of the art is such that new things are learned and applied in its manufacture to its improvement?

A. There is, sir, yes sir.

Q. Now, you mentioned in your direct examination certain colors which appeared upon Exhibit A and which you say could not be produced by any manufacturer of paints without employing some of the ingredients mentioned in Class B; you spoke of that did you now?

A. Yes sir.

Q. You have never been in North Dakota probably?

A. I believe I rode through there.

Q. You understand, generally speaking, that it is an agricultural state with very few large towns in it?

A. Yes sir.

244 Q. And with almost no manufactories there?

A. Yes sir.

Q. Now, Mr. Toch, is it not true that from 90 to 96 per cent. of all the mixed paints which would be ordinarily required and used in a state like North Dakota could be made and the colors produced that would be required for use in that state, without employing any of the ingredients mentioned in Class B?

A. Can I ask a question, for information, of you, whether the barns there are mainly painted red. Is there any red oxide paint used, Professor?

Mr. LADD: As near as I can estimate, I should say perhaps ten per cent. of the buildings have red colors, not all, perhaps, red oxide.

The WITNESS: That which is composed of red oxide could not be made without the addition of some materials in Class B.

Q. Excluding that class, would it then be true that more than ninety per cent. of all the paints required for use in the state of North

Dakota could be manufactured without the use of any of the pigments described in Class B?

A. No, because there are quite a number of other colors which cannot be made without the use of materials in Class B.

Q. Well, I mean of the class of paints that ordinarily would be used in the state of North Dakota.

A. Yes sir, with the class of paints that ordinarily would be used anywhere.

Q. Of course any evidence that you give upon this question is without knowledge of the classes of paints that are in fact used in North Dakota, colors and so on; you have no knowledge upon that
245 question, Mr. Toch?

A. No, not having examined the paints there.

Q. I take it, from your answer to one of the last questions asked you by Mr. Zeisler, that, in the analyses of paints made in your laboratory, you very seldom find sublimed lead used as an ingredient; that is right, is it?

A. I was referring to the technical paints at the time.

Q. Well, are analyses made in your laboratory of the ingredients of paints in which you frequently find sublimed lead present as an ingredient?

A. Not frequently but sometimes.

Q. Well, in your answer to Mr. Zeisler you seemed to mention it as a rather rare and seldom thing when you found any of this sublimed lead in an analysis.

A. Exactly.

Q. Well, that is true, then, isn't it?

A. It is true of two particular kinds of paints.

Q. Well, I want to know as to all kinds of paints which go through an analysis or test in your laboratory. Include them all and tell me whether you frequently find sublimed lead or find it only very seldom.

A. If you will permit me, the black paints and dark structural paints which come to us do not contain any, they cannot contain any. It is only in the lighter shades and some that our competitors send us for estimation that we find sublimed lead.

Q. Well, you don't claim to have much if any familiarity with sublimed lead as the result of tests or analyses made in your laboratory, do you?

A. Well, in a general way I think I do.

246 Q. Well, you have not testified here in a way that would indicate to one hearing you testify or reading your testimony that you are accustomed to frequently find sublimed lead present in the samples of paint which you analyze or the analyses of which come under your supervision; that is true, isn't it?

A. That is perfectly true.

Q. What were the brands of paints or mixed paints in which you say you found or there was contained sublimed white lead?

A. I would have to look up our records for that.

Q. Can you give me the name of one single brand of mixed paint in which you found it?

A. On the ground of professional courtesy I could not give you the name of any one for the reason that these samples are entrusted to us for an expert opinion.

Q. Well, have you in mind now, Mr. Toch, some brands of paints in which you found present as an ingredient sublimed white lead; have you such brands in mind at this time?

A. When I received the bulletin of Prof. Ladd, I looked through it and went through our samples at the time and I found one of Prof. Ladd's analyses and looked up one of ours to see how closely the figures were, and it happened to be that the paint which was analyzed was a paint conttaining sublimed lead and I found that our analysis and Prof. Ladd's analysis was very close.

Q. Will you give me the name of that brand?

A. I am just going to look through and find it.

Mr. LADD: 602?

A. 602, is it?

247 Mr. LADD: I think so. No I don't know whether that is the one you refer to or not.

A. No, it was from another Chicago concern.

Q. You don't refer then to the sample No. 66?

A. No, it was not the sample 66.

Q. Well, can you give me the name of the brand or name of the manufacturer in whose preparation of mixed paint you found sublimed lead?

A. It must have been this No. 66, although it had a different label on. It was, I remember distinctly, from Chicago, or it was evidently from somebody from whom or to whom Montgomery Ward had sold their product with another label. I am reasonably sure it is 66; I wouldn't be very certain about it.

Q. Now, going back over all of the analyses that have been made in your laboratory for the past ten years, would you give us the name of any other brand or the name of any other manufacturer of mixed paint in which you found present sublimed lead?

A. I couldn't do that without looking up our records.

Q. Do you have in mind at this time the name of any other manufacturers or the name of any other brand which you examined or which has been examined or tested under your supervision in the past ten years which contains sublimed lead?

A. I have none in mind at present.

Q. Well, if it were a fact that sublimed lead is generally or ordinarily used in the preparation of mixed paint in the United States, or has been within the past five years, you, with your wide expert knowledge on this subject, your great study on the subject,

248 would know about it, wouldn't you, and would be able to name some of these parties?

A. I mentioned before that it was a question of professional courtesy in regard to some of the people who would trust to me their formulas and on that account I cannot testify as to the composition of what the sample may show.

Q. But you cannot put this on the ground of refusal to answer my

question. I asked you whether you had in mind or could remember the name of any brands of any manufacturers other than 66.

A. We have a card system in our laboratory; I don't know how many thousand cards are represented in there of paint analyses, and I am very glad not to have to burden my mind with those things that I am able to forget.

Q. And you who believe that if the production of carbonate of lead and of oxide of zinc entirely ceased and who believe and stated here under oath that these other substitutes would in your opinion make just as good a paint, are yet not able to remember from all these analyses the name of a single producer or manufacturer of paints who uses sublimed lead in the making of mixed paints; that is true nevertheless, is it?

A. That is, yes sir.

Q. And when you came to examine this bulletin of Prof. Ladd's you were able to pick out from your laboratory the single test of paint made by this one manufacturer, Montgomery Ward & Company, but under a different label, in which there was present sublimed lead; that is true, is it?

249 A. It was a very peculiar coincidence.

Q. Well, that is true just the same, is it?

A. That is true.

Q. And you come here from New York to testify in this case and absolutely the only mixed paint that you are able to pick out upon the stand and tell us here contains sublimed lead is this one put out under a different brand but by the same manufacturers as No. 66, and which is the only one you can tell about that contains sublimed lead; that is true, is it not?

A. I shall be very glad to explain that to you.

Q. All right.

A. The sample that we had in question when I looked through these things and found this one containing sublimed lead, was reported to me by my first assistant, and he brought me the can and brought me the result, and he said, "Here I think these are the same things," and I looked at the can and found it had been sent to us from Chicago and that the label on that thing didn't warrant me from saying that it came from Montgomery Ward, but the analysis showed it to me to be about the same thing. A particularly high percentage of water was something that we had talked about in the laboratory for a very long time. I had lunch every day with my three assistants and we talked shop naturally all the time. And this question had come up at the time when the analysis was made, as to how a thing of this kind had found its way on the market.

Q. You say that our professional ethics would not permit you to give the name of a manufacturer who had submitted any of his paints to your analysis or test?

A. Certainly not.

250 Q. Well, if his paint had been nothing but carbonate of lead and oxide of zinc, it would not hurt him any for you to make known the results of your test, would it?

A. I wouldn't have any right to.

Q. But if it contained sublimed lead, you would consider that it would or might become very detrimental to him as a manufacturer of mixed paints?

A. Why, not at all.

Q. You won't put it on that ground at all?

A. It is the custom among paint manufacturers, I understand, to supply their salesmen with formulas of their competitors' paint, and it is known, or generally known, one man knows what another man uses; but I have no moral right to say what I am professionally asked to keep secret.

251 Redirect examination.

By Mr. ZEISLER:

Q. Mr. Watson asked you whether you were acquainted with the kind of paints used in the state of North Dakota, calling your attention to the fact that it was largely an agricultural community. Have you ever visited other agricultural communities in the United States than the state of North Dakota?

A. Only in a passing way.

Q. Well, are you in a general way acquainted with the kind of paints that are used on farm houses, barns, fences and other such services?

A. I am.

Q. In the country?

A. Yes sir.

Q. State approximately the number of manufacturers whose products you have from time to time examined and analyzed?

A. Oh, you mean professionally?

Q. Yes, the number where you have made an analysis.

A. Well, we have examined the paints of Sherwin Williams Company——

Q. Well, I don't ask you for the names. I told you to tell me approximately the number of manufacturers whose paints you have examined.

A. Approximately I couldn't say, but there must be a great many. Everybody that comes in competition with us in our structural paint department.

Q. Well, about how many?

A. Oh, that would be anywhere from fifteen to twenty.

252 Q. Now, did I understand you to day that you do clearly recollect that among these samples examined in these years, you did find quite a number of cases where sublimed white lead had been used?

A. I recall two particular cases of a structural paint submitted by an elevated railway.

Q. But you con't know who was the manufacturer?

A. The name of the manufacturer was not on the samples submitted by that road.

Q. So that, while the names of the manufacturers whose paints

contain sublimed lead are not in your mind, instances where you found sublimed lead are in your mind, are they not?

A. Yes, and one represented probably sixteen to twenty thousand gallons of paint, one sample.

Q. You mean it was a sample of a lot containing between fifteen and twenty thousand gallons?

A. Yes sir.

Further proceedings were here adjourned until Tuesday, January 23, 1906, at 9:45 A. M.

253 FRANK A. LAKE, Sworn.

Examined by Mr. ZEISLER:

Q. State your full name.

A. Frank A. Lane.

Q. How old are you?

A. Thirty-five.

Q. Where do you reside?

A. Milwaukee, Wisconsin.

Q. What is your business?

A. Paint manufacturer.

Q. Are you an independent manufacturer?

A. I am employed by the Patton Paint Company in the capacity of manager of manufacturing trades.

Q. Is the Patton Paint Company one of the complainants in this case?

A. Yes sir.

Q. When did you begin having to do with paint manufacturing?

A. In 1885.

Q. How old were you then?

A. I was just about 15.

Q. Tell us, in your own way, the experience that you have had and the various positions which you have filled during the time you gained that experience, from the time when you first started having to do with paint manufacturing until the present time; give it to us fully.

A. At the age of fifteen I went into the manufacturing establishment of John M. French & Company of Toronto, Canada. I was steadily engaged with him in the different departments, starting in the packing room of the mixed paint department, and working through the making rooms, the grinding rooms and the mixing rooms, and was made superintendent of his factory at the age of twenty-one. In '93 I resigned from the company and ac-

254 cepted a position with the McLennan Paint Company of Buffalo, as superintendent of their factory. In September, 1899, I got a leave of absence from the McLennan Paint Company for one year—didn't sever my connection, but a leave of absence for one year—and went to London, England, in the capacity of expert for Wilkinson Harwood & Clark of Storer's Wharf, Poplar, London, E. C., and the varnish works at West Drayton.

Q. What is that London concern's business?

A. Manufacture of paints, colors, varnishes and lubricating greases.

Q. Go on.

A. I remained with them thirteen months and returned to Buffalo in 1900; left London on the 16th of September, returned direct to Buffalo and joined the McLennan Paint Company, or, rather, took up my duties with the McLennan Paint Company and remained with them until the 15th of last March. I resigned on the 15th of February, taking effect the 15th of March. I reserved for myself thirty days but made arrangement for join- the Patton Paint Company on the 15th of April. During these thirty days between my engagement with the McLennan Paint Company and the Patton Paint Company, I spent visiting the paint manufacturers of the United States, those that I could go and visit on invitation or otherwise.

Q. And what would be your purpose in that?

A. To make myself familiar with their method and to compare notes, as the paint manufacturers say.

Q. What were your duties with the McLennan Paint Company?

A. I was general superintendent.

255 Q. What does that imply?

A. I had the direct hiring of all employés outside of the office and including the stock department and the formula department in the office.

Q. The formula department?

A. The formula department, which includes the formulation department, experimental rooms and laboratories. I was responsible for all of the raw material from the time it was received in our factory until it was loaded onto a common carrier as a finished product; in other words, entire charge of the manufacture.

Q. Then do I understand that the manufacturing department was under your supervision?

A. Entirely.

Q. Does the McLenan Paint Company exist as such still?

A. I understood they sold out last week.

Q. To whom?

A. To the Detroit White Lead & Color Works, but that is not confirmed. I am a stockholder and I will probably get the confirmation when I return to Milwaukee.

Q. You are not a chemist, I understand?

A. No sir, I never studied chemistry or took any degree.

Q. From the theoretical side?

A. No sir.

Q. You haven't made analyses yourself, have you?

A. No sir.

Q. Have analyses been made in your various positions under your supervision?

A. Under my direction and under mu supervision.

Q. Have the results in those cases always been submitred to you?

A. Always.

256 Q. Tell us, as fully as you can, what physical tests and experiments you have made in your various positions. I don't mean the details of them but, in a general way the character and extent of the tests and experiments.

A. You are only interested, of course, in the experiments that were made after I left Canada. Am I to understand that?

Q. Yes.

A. When I took charge of the McLennan Paint Company, naturally the first thing to do was to make myself familiar with all of the paint materials that I could find or secure, and did do so, starting before the factory was running, when the experimental department was running before the engines were running, and have carried on those tests with the McLennan Paint Company all the time I was there until I left. Those physical tests were made by first, in a physical way, examining the materials, rubbing them up under the knife to learn of the nature of the material, to get familiar with its structure from a practical man's point of view, then grinding in a practical way, thinning out, applying to surfaces and, if the materials were intended for exposure work, exposing. All of the tests were tabulated and all were examined at stated intervals, depending entirely on the materials we were testing, and allowing them to remain out in an open position until we had decided they were useless or valuable. If useless, they were taken in and so noted. If valuable, it was noted and the exposure was continued, until such time as I felt that any further exposure would be useless.

Q. Until you had reached definite results?

A. Definite conclusions.

257 Q. How many such tests were made by you or under your direction and observation?

A. I couldn't name a specified number. I have had an exposure at one time as high as 1300 different samples exposed, combination samples exposed of different materials in different proportions.

Q. And where was that exposure had?

A. We always made it on the roof of our house building.

Q. And how long would some of these experimental exposures continue?

A. The longest exposures that I had out were exposures from 1894 until October 17, 1904, and the building burned down; otherwise they would probably be there yet.

Q. And other exposures were continued for varying periods?

A. Varying times from one month up to eight years.

Q. The McLennan Paint Company, during all the time that you were with them, were manufacturers of mixed paints, were they?

A. No sir, no, we put mixed paints on the market the fall of '95.

Q. Then they were mixed paint manufacturers from the fall of 1895 until April, 1905, when you left them?

A. Yes sir.

Q. What was the volume of the mixed paint business of the McLennan concern, say during the past few years of your connection with them?

A. The last year I was with them, their mixed paint business was $137,000. I was a director of the company for five years and the figures were always available.

Q. State what white pigments you tested, both in their commercial state and as ingredients of paint.

258 A. White lead, so called, carbonate.

Q. You mean carbonate of lead?

A. Carbonate of lead; oxide of zinc, zinc from western ores; zinc lead, leaded zinc; sublimed white lead; lithophone in its various forms; penolith, Brazil white and lithophone; the carbonates of lime; the sulphates——

Q. Sulphate of what?

A. Of lime; silica, commonly called silex; barium sulphate, the natural product and made, the artificial; in fact, all of the known white pigments which are generally known in this country.

Q. Silicate of magnesia?

A. Yes.

Q. You were present during the examination of the witnesses yesterday, were you not, Mr. Lane?

A. Yes sir.

Q. You heard how I grouped these various pigments into statutory pigments, Class A pigments and Class B pigments, did you not?

A. Yes sir.

Q. We will continue in your examination to refer to these classes in the same way. As the result of your practical tests, what had become your conviction regarding the qualities of carbonate of lead and its shortcomings, if any?

A. I regard it as a more or less valuable pigment. It has many shortcomings for exposed work, it perishes very rapidly for interior work, it turns yellow, changes its color; for floor paints or paints coming in contact, it is very readily destroyed, very quickly destroyed.

Q. You mean where the surface is subject to strong physical contact?

A. Yes sir, that is what I mean.

259 Q. How about oxide of zinc?

A. Oxide of zinc is a more or less satisfactory pigment, very good for interior work. I don't consider it a good pigment for exterior work, especially alone. In using the word "alone," of course it is understood that I mean with the proper vehicle but it to form the only white pigment present.

Q. What are its shortcomings on the outside?

A. Well, it doesn't withstand the action of water. It dries very brittle and hard, cracks, chips and peels; besides it presents a surface, after being on a few years, that is almost impossible to repaint, owing to the fact of its drying so brittle and so hard. The following coats will not adhere to it or fasten themselves to that material.

Q. What is the action of carbonate of lead in that regard?

A. The direct opposite. It chalks or rubs off and presents a very spongy or porous surface and, in repainting, the first coat that

is applied after a reasonable term of years is practically absorbed or taken up by it; you might say, lost.

Q. So that you do not regard the surface left from a paint containing carbonate of lead as favorable for repainting, do you?

A. No sir.

Q. Now, then, how about a combination of carbonate of lead and oxide of zinc?

A. It is quite an improvement over either of the statutory pigments alone?

Q. And what, then, will you say as to the qualities of a combination between the statutory pigments, without the addition of
260 any other white pigment and the shortcomings of that combination, if any?

A. Well, it is an improvement over the single pigments, a step in the right direction, but I do not consider it a complete paint because the combination has the weakness of both pigments.

Q. How about the action of mois-ure or rain on this combination?

A. It destroys it, destroys the folm and the material disintegrates. A combination of that kind is destroyed without rain, or an exposed surface of either of the pigments without rain is destroyed. I have made tests along that line, putting them out to the weather but keeping the rain off of them, that is, putting them out to the sublight, the action of the air?

Q. Simply subjecting it to atmospheric conditions without the moisture?

A. Well, there would be naturally moisture but the rain would not be hitting it like an exposed surface. I protected it by a suitable covering of glass which would let all of the sunlight through and expose the face of the paint. I mean by that, if I do not quite make myself understood, I made a veranda, if you would like to call it, of glass, putting a glass top over it and put my samples under it.

Q. Within that time would you notice the decomposing effect of exposure to atmospheric conditions upon a combination of carbonare of lead and oxide of zinc?

A. Well, to me who is *sued* to examining samples, I notice an effect in thirty days.

Q. But would you *that* that within thirty days the coat of paint had become useless?

A. Oh, no, by no means.

Q. Very well. Now, then, what I mean is, within what
261 time would you notice that this influence was strong enough to really destroy the usefulness of the coat of paint?

A. Well, if you mean that the surface really required and should be repainted, my best combination of those two pigments, three years.

Q. In what proportion have you found that carbonate of lead and oxide of zinc should be mixed to produce the best result?

A. Only two pigments present?

Q. Yes.

A. Approximately half and half.

Q. Now what, in your experience, is the effect of using too much carbonate of lead, that is, to use more than about half, and what is the effect of using more than about one-half of oxide of zinc?

A. Well, I don't confine myself to half and half; I said that combination about half and half, up to sixty per cent. you might go either of the pigments without changing it really from half and half.

Q. Without materially changing the result?

A. Without materially changing from half and half, but go beyond that point with either of the pigments and the results are not nearly as good.

Q. In what direction?

A. Well, if I exceed sixty per cent. of oxide of zinc my surface chalks badly, cracks and in many cases peels. If I exceed sixty per cent. of the carbonate of lead it chalks very much quicker than it would if I had confined myself to what I call a reasonable amount.

Q. Now tell us what has been your conclusion regarding the comparative usefulness and virtue of the various pigments in
262 Class A; go through the line and start with——

A. Generally?

Q. Yes, you may give it to us generally, if there is a general virtue that they possess.

A. Well, I would prefer to take each pigment by itself.

Q. Before I do that I want to ask you, in your enumeration of the pigments with which you have experimented, you spoke of zinc from western ores and leaded zinc; do you distinguish between those two?

A. Well, we do in the factory only; it is not generally; I don't know as the trade does it generally, but in the factory I do. I distinguish between those two.

Q. What is the distinction?

A. Higher percentage of lead.

Q. What would you call the one containing the higher percentage of lead sulphate?

A. I would call that—well, the one containing the higher percentage of the entire range, I would call that Canon City zinc lead white; that is a distinctive name; we can't make any mistake on that. But on the other zincs made from western ores, the ones containing the higher percentage of lead sulphate and lead I call them leaded zincs, just simply to distinguish the difference in the factory.

Q. Those containing a comparatively smaller percentage of lead sulphate you call zinc from western ores, and those containing the higher percentage of lead sulphate you call leaded zinc?

A. Yes, sir, that is the idea.

Q. Now, about sublimed lead, under the general question which I have heretofore asked.

A. Sublimed lead was first brought to my attention in the fall of '93, or shortly after I accepted my position with the McLennan Paint Company; up to that time I hadn't seen it. I included it
263 with the rest of the pigments in my general test which I have already described, when I first wanted to make myself fa-

miliar with the white pigments of the American market, and I continued experimenting. We were not manufacturing mixed paint but in 1894, I think it was in March, '94, we started to use sublimed white lead in our general business, continuing our experimenting with that material. When we were ready to put our mixed paint on the market we selected that as being the best white pigment in the American market, as far as we were able to locate, of all the pigments we could find, and adopted that as our pigment under which we were going to build or make our business on mixed paint, starting out from that time and continuing to use it up to the time I left the McLennan Paint Company.

Q. In so determining, Mr. Lane, did either you or your employers, so far as you know, determine upon sublimed white lead instead of another opaque white pigment because of its being cheaper or, if not for that reason, then for which reason?

A. For the reason that we made the most durable paint by the use of sublimed white lead, and no other reason.

Q. Did the question of cost at all influence you?

A. It had no bearing on the subject whatever, for the reason that the McLennan Paint Company was a new house, had no mixed paint business and this country was crowded with large and well know- mixed paint houses, and we had to get a reputation to get in business.

Q. A reputation for what?

A. For good paint.

264 Q. What was the result of the use of sublimed white lead so far as the extension of your mixed paint business was concerned?

A. Well, from a mixed paint business of nothing, we went to $137,000 in eight years, and at no time had more than seven traveling men introducing the goods.

Q. Was the growth sudden or gradual?

A. It was gradual.

Q. Did you have occasion to make examinations of sublimed white lead at various periods and coming from distinctly separate lots during a course of years, with a view to determining the uniformity of its composition?

A. To make that clear I will give you a synopsis of our methods of receiving raw materials. We had a laboratory in connection with our business at all times, in charge of a graduated chemist and assistants when necessary. No materials were received by the McLennan Paint Company, that is, acknowledged as received, until a sample of the material had been sent to the laboratory and, if necessary, an analysis made of it, but at least an examination. The result of that examination was made on a slip, a pass slip, and was brought to me for my initial or in my absence the initial of Mr. C. J. McLennan. After that initial the receiving clerk took the goods in and it became the property of the McLennan Paint Company. If it didn't come up to our requirements, it was immediately rejected. We didn't unload any carloads, take any carloads into our buildings until they had been passed upon by the laboratory; single

wagon loads, of course, would be permitted to be taken into the receiving rooms or warehouse until the examination was made,
265 but if it were not satisfactory it was immediately rejected and the supplier was notified to that effect.

Q. Now, did you adopt a standard for the composition of sublimed lead?

A. Yes sir.

Q. What was that?

A. Well, first we sent to our laboratory a large sample of the pigment itself. That was indexed and labeled and all shipments were compared against that for color—that means whiteness—and fineness, and as each carload was received samples were taken in and compared with that. We allowed, or rather I notified the laboratory or testing department that we would allow a variation of five per cent. between shipments to arrive and the standard which I had delivered to the laboratory by instructions, and all subsequent shipments were compared with that and the specification or, rather, letter of instructions consisted of 75 per cent. of sulphate of lead, 20 per cent. of oxide of lead and five per cent. of oxide of zinc. That is the material in combination as contained in sublimed white lead, as I understand, oxy-sulphate of lead.

Q. Now, did you notify the manufacturer of sublimed white lead of that requirement?

A. No sir, the only thing in making our contract for our supply of sublimed white lead, our contractor had to guarantee the material equal to sample, meaning his first and adopted shipment, but we said nothing about a component part or any specification. He simply guaranteed his sample.

Q. Now, how long were you receiving sublimed white lead, I mean for how many years during your employment with the
266 McLennan Paint Company?

A. Well, I adopted the use of sublimed white lead in '94, and I was receiving it up to the time I left. Of course, during my absence in England, Mr. McLennan was initialing the laboratory slips.

Q. Did you ever have occasion during those years to reject a lot of sublimed lead sent to you?

A. Not a lot nor any portion.

Q. Did you ever get a complaint from a dealer or user of the paints made by the McLennan Paint Company wherein you used sublimed lead, as to its quality in any direction?

A. Yes, yes, I did.

Q. Now, what were those complaints based on?

A. The case I have in mind they complained that the paint was running; that is, it was sagging on the side of the building, I investigated and found it was a fact and concluded the paint was too thin. I took a sample of it back to our factory and found it was too thin, too much oil had been added, and as this particuler job didn't agree with any materials we had on the premises, we naturally said that the painter had put oil in it to excess. He, of course, didn't

acknowledge it, but it was owing to the fact that we had an excess of oil.

Q. Do you mean that you had an excessive — oil.

A. There was present an excess of oil in that particular paint on this job.

Q. When you speak of too much oil having been present in the mixed paint, do you mean in the cans of paint that left your
267 factory?

A. No sir, in the cans of paint that were open on the job, being applied by the painters. We took it back to the factory to have an examination made of it, and our chemists made an analysis of it and we could find no stock on our premises that agreed in proportions with this particular paint. Therefore we concluded the painter had put too much oil in it.

Q. Now, that had nothing to do with the presence of sublimed lead, did it?

A. None, whatever, but you asked a broad question and I had to turn over in my mind to——

Q. I am very glad that you did give us a broad answer. Now, any other complaints of your mixed paints containing sublimed lead which had anything to do with the condition of the paint as it left your warehouse?

A. Perhaps you had better put that another way. If you were to ask me if there was any complaint on Onyx mixed paint—that was McLennan's brand—that had to do with sublimed lead being present, I could answer positively no.

Q. That is really all that I am interested in now.

A. There might be a complaint on sublimed lead and investigation might reveal the fact that sublimed lead had nothing to do with it.

Q. Then from all your experience with sublimed white lead, both through exposure tests and through observation of its usefulness or lack of usefulness on the other hand, if there was such a case in the cases where it was personally used by the consumers, what has become your convictions regarding sublimed lead as a pigment to be used in mixed paints where an opaque pigment is desirable?

268 A. I consider it the best pigment available.

Q. What about the dirability of paint so far as it is affected by the presence of sublimed lead?

A. The paint is not affected, as I would term it, by the presence of sublimed lead; it is improved.

Q. Well, then, the effect is that the durability is increased; is that what you mean?

A. Yes, that is what I mean.

Q. Compare the effect of sulphur gases and the like upon the statutory pigments on the one hand and sublimed lead on the other when present in mixed paint?

A. Well, I would like to qualify just a little on that, Mr. Zeisler, I do not know what the gases are that are present in the atmosphere. It is only hearsay as far as I am concerned, not being a chemist,

but I know as a fact that whatever gases are present in the atmospheric conditions, they destroy, discolor and wear out, if you like to put it that way, in plain English, any combination of the statutory pigments very much quicker than they do a sublimed white lead paint. A sublimed white lead paint will retain its color longer, will present an even surface and a pleasing surface longer than any combination of the statutory pigments. I do not know what the gases are or their combination, but I know the results.

Q. While you were in England, did you find there what passed there as sublimed lead?

A. Yes sir.

Q. Was it an article made in England?

A. Yes sir.

Q. How did it compare in quality with the article made in the United States?

269 A. A very poor article in comparison with Picher's sublimed white lead.

Q. Please look at the book which I show you, Mr. Lane, and state what that is.

A. It is a book on painter's colors; the title is "Painter's Colors, Oils & Varnishes, by George H. Hurst, F. C. S."

Q. What is the date of the publication of that book?

A. It is signed or printed by Cjar-es Griffith & Company, 1892.

Q. Are you, in a general way, acquainted with Hurst's work?

A. I have a copy of that book.

Q. Now, is this the first edition?

A. It is, as I understand it.

Q. Now, please compare the last two paragraphs of page 49 of this first edition and the first half of page 50 in the first edition with the last two paragraphs on page 53 and the upper half of page 54 of the third edition of the same work by Mr. Hurst, and after you have made the comparison, please state whether there is any change in the phraseology or anything else as respects the parts indicated, including the analyses of two samples of sublimed white lead at the top of page 50 in the first edition and 54 in the third edition.

A. It is identical, every word and figure.

Q. What is your experience as to the uniformity of composition and color and perhaps other qualities of carbonate of lead?

A. It varies very greatly.

Q. Can you state within what limits, according to your
270 observation? I am now speaking, of course, of the ordinary grades of commercial white lead.

A. They vary very much in color; some have a bluish cast, some have a reddish cast, some are decidedly yellow. The covering or hiding properties of some are very much greater than others. The grinding properties of some are very poor compared with others. And my practical experience leads me to the conclusion that it is a very unstable pigment. I will give you an instance that will probably assist you in determining how I reach my conclu-

sions. While I was in England my company purchased six carloads of white lead, made in Philadelphia On my return to Buffalo, I found the product there. They hadn't started to use it. Before I started to use it I made a physical examination of it, not a weather test because I didn't have the time, couldn't hold the material over two or three years while I would make my exposure tests, but I took the material and examined it physically and reported my findings to our president, Mr. C. J. McLennan, and he concluded we hadn't better use it. The following midsummer the material was still in our possession and our funds weren't greater than we needed, as our business was growing very rapidly and our capital was always too small, so he somewhat reluctantly told me or instructed me to use it, in other words, ordered me to use it. I used that material in Onyx mixed paint. That was the only time that any lead outside of sublimed lead was introduced. That cost the McLennan Paint Company over $7,000. The material jellied or hardened in the can. That is generally known amongst the paint trade of this country unfortunately. We took back hundreds
271 of gallons of it. In other words, it cost us over $7,000 to rectify, if we could, a mistake by using carbonate of lead when we should have used sublimed. Therefore I conclude and maintain that no carbonate of lead should be used unless it is tested in a physical manner and by exposure tests at least two years. In my opinion, if it was a stable article, I do not believe it would be necessary to make that exposure test.

Q. As to the variance between various samples of carbonate of lead in chemical composition, are you in a position to testify?

A. Yes sir; I had analyses made directly under my supervision and saw the result of the analyses.

Q. And what were the variance that you found?

A. Carbonate of lead varied from 70 to 85 per cent.

Q. Hydrate of lead?

A. Hydrate of lead varied from 15 to 30 per cent.

Q. State whether or not that is due to the different processes adopted by various manufacturers of white lead.

A. I couldn't state positively because the same company has supplied me with carbonate of lead. That varied, and I didn't conclude that they had changed their process because the properties had varied. I concluded they had still continued in the same way but it was incidental or something that could not be controlled.

Q. How about the fineness of the particles of sublimed lead as compared with carbonate of lead or oxide of zinc?

A. Sublimed white lead is very much finer than carbonate of lead and in that respect resembles the fineness of oxide of zinc. It is finer than some grades of zinc and not as fine as others.
272 I have in mind French zincs, the higher grade French zincs.

Q. How about the comparison with carbonate of lead?

A. Oh, it is very much finer; I have already stated that, Mr. Zeisler.

Q. Is that a valuable quality of a pigment in mixed paint?
A. Oh, yes, in any paint.
Q. In paint of any kind?
A. Yes sir, any paint used for protecting or beautifying effects.
Q. Now, what is your conviction, based upon practical tests and experience, as to the value of zinc lead white, the Canon City product, as a white pigment?
A. I consider it a very valuable pigment and in paint where I want zinc in some proportion or, in other words, a combination of lead and zinc, I consider it an ideal pigment.
Q. Compare it with any combination between the statutory pigments?
A. It is better.
Q. In what respects?
A. The finished product, finished paint, when first applied, presents a better appearance. It works, if anything better under the brush, and I have applied a lot of paint in my time and at periods ranging from one month to five years it has a better appearance all the time. I have no experience of a combination of the statutory pigments in a mixed paint as against zinc lead, the Canon City product, exposed on the surface side by side, under the same conditions, longer than six years.
Q. Well, that will do; six years will do.
A. I have — repainted any surface after that, but from the
273 time of application up to six years it presented a better appearance and the work had a better protective coat. In other words, it was more pleasing to the eye and the surface was better protected where the zinc lead was used.
Q. When you say "better protected," do you mean better hidden, or do you mean that and something else?
A. I mean that and something else. I mean protection in the full sense of the word. There was no checks or cracks in the surface of the paint. It was better hidden or covered if you like to put it that way, and therefore the surface beneath the paint had a better protective coat and it was more pleasing to the eye naturally, as there was no checks or cracks present. The color had remained in better condition; it was not discolored so much as a combination of carbonare of lead and oxide of zinc.
Q. I find, in the Bulletin No. 67, which is an exhibit to the affidavit of Prof. Ladd, filed in this case, in discussing zinc lead white on page 584, it is said that the chief objections made to zinc lead white are that they are not always uniform in composition or in color. Now, I believe you told us that the same thing is true of carbonate of lead; is that so?
A. Yes sir.
Q. But assume that the objection, so far as uniformity of color is concerned, were well taken, would that impair the usefulness of zinc lead white as a pigment in tints?
A. In the majority of tints it would not.
Q. Now, upon the assumption that I made, would it be an objection?

A. Well, if it was off-shade it would be objectionable in an ivory. Ivory is a tint, being off the white.

274 Q. Ivory, however, is rather a highly white tint, is it not?

A. It is a tint, though.

Q. Yes. Then you mean just those tints approaching what we regard as white?

A. Yes sir.

Q. In anything than pure white or what would approach white——

A. Call it ivory white, if you care to; it is commonly called ivory white.

Q. Then in anything but pure white and ivory white and some other tint approaching white, you would not regard this objection as valid?

A. No.

Q. And does the same objection exist in your experience with reference to the uniformity in composition of zinc lead white?

A. It runs very uniform.

Q. Now, speaking of zinc from western ores, what is your experience with that and what is the result of your experience?

A. I consider that zinc from western ores in all cases, with one exception, is better than eastern zinc or oxide of zinc.

Q. What is that exception?

A. Where I want to use a resin, a resin varnish. Now, I mean by that a varnish made from a resin which comes from the south of this country, the residue after the turpentine is distilled. A western zinc containing lead will not mix with resin, but as that would be an extremely cheap product, it is really, looking at it broadly, it is really a benefit to the product.

Q. In other words, a man using zinc from western ores would be prevented from using a cheap thinner?

A. That is it. A cheap thinner containing resin.

275 Q. Tell me whether or not it is the presence of lead in the zinc from western ores that would prevent the use of a resin vehicle?

A. It is.

Q. So that the same exclusion of resin would follow wherever you used lead?

A. Yes sir.

Q. Any form of lead?

A. Yes sir.

Q. No matter whether it is carbonate of lead or sulphate of lead?

A. It don't make any difference, in my experience.

Q. Or oxide of lead?

A. Or oxide of lead.

Q. How about lithophone now?

A. I have examined lithophone in its different forms, under different trade names, practically the same in each of them. I consider that lithopone is a valuable pigment and has its uses.

Q. What is its value?

A. Its value is the hiding power the pigment possesses, its extreme

fineness of particles, and especially its color. It is the whitest pigment that we have. It mixes readily with the different varnishes made from the different gumes, includes them all. I have never met a varnish or found a varnish that would not mix readily with lithopone, and for that reason I consider it an ideal pigment for inside enamels or enamel paints. In Buffalo we made a line of enamel paints; I believe we were the originators of a line of interior enamel paints, in the broad sense of the word, put up in gallon cans, or from pint cans to barrels, material that would apply as easily as an ordinary paint and dry in 12 hours, with an enamel finish. I believe we are the originators of such a product.

Q. How does it compare in opacity with all other pigments?

276 A. You mean the hiding power?

Q. Hiding power.

A. I said it was very high in hiding power, an extremely good pigment when used in an enamel or in an inside paint.

Q. Under what circumstances have you found it objectionable?

A. On outside exposure.

Q. That objection is what?

A. It turns dark, turns gray, has a blackening effect.

Q. Now, how about using it as a primary or first coat?

A. I have used a great deal of it for that purpose, sold a great deal of it for that purpose.

Q. And with what effect?

A. Good effect.

Q. Even in outside work?

A. Yes, in outside work.

Q. Now, so far as inside work is concerned, where the effect of the light is not so strong, what would you say as to whether its aptitude to change color under the influence of light is an objection to it?

A. We are assuming that we are using the best grade?

Q. Surely.

A. No objection.

Q. How about floor paint?

A. Lithopone is a good pigment to use in floor paint.

Q. How does it compare with other pigments as an ingredient of floor paint?

A. It compares very favorably, excels most of them.

Q. What quality does it give to an enamel which is desirable in an enamel?

277 A. It gives opacity or hiding power, free working qualities, as compared with other white pigments.

Q. Compare it with the statutory pigments and not the other pigments.

A. Well, there is only one of the statutory pigments that we could really use for an enamel and that is oxide of zinc.

Q. How does it compare with that then?

A. It has better covering or hiding properties. It works freer under the brush, flows out better. By that I mean wipes off its brush marks, doesn't show the brush marks such as oxide of zinc enamel would and it would have a higher gloss if used in the same vehicle.

Q. Why can you compare it with only one of the statutory pigments, namely, oxide of zinc, why can't you compare it with carbonate of lead for enamel purposes?

A. Well, I can compare it with that if I choose, but practice excludes the carbonate of lead because it turns yellow inside and in many of the resinous varnishes, especially the pale ones which we have got to use to make a white enamel, lead would liver or jell and therefore we could not use it.

Q. Couldn't use it for enamel paints; is that what you mean?

A. We could use carbonate of lead for enamel paints, but for interior enamel paints, such as are used in public buildings, homes, hospitals, etc., we couldn't use it. If we wanted to enamel this room brown or black, why, we couldn't use it there on account if the color, but if we wanted a lead color, dark lead color, provided we weren't particular about a high gloss, and we weren't particular as to how long our gloss stayed, we could use it, but for practical purposes, I mean, we couldn't use it.

Q. What is the vehicle that must be used or is used to the
278 greater advantage is enamels?

A. It must of necessity be of a resinous varnish nature.

Q. And how about the action of this varnish upon the lead or lead upon the varnish?

A. Oh, it has a thickening effect and a jellying effect.

Q. What I mean is, is carbonate of lead inert upon varnish?

A. It is not.

Q. Is lithopone inert upon varnish?

A. It is.

Q. Well, what is the result then?

A. The result is, in one case we have a satisfactory valuable finished product.

Q. In the case——

A. In the case of lithopone. In the other case we have a product that is unmarketable and so useless.

Q. You have not told us yet about the qualities of zinc lead white, leaded zinc or zinc from western ores and lithopone, with reference to the quality of presenting a proper surface for repainting. What is your conclusion from your experience as to that quality in the pigments mentioned as compared with the statutory pigments?

A. Zinc lead alone or with its proper vehicle presents a surface that can be readily—lends itself readily to being repainted at any period.

Q. Is it poorer, as good as or better than the statutory pigments for that purpose?

A. It is better.

Q. How about zinc from western ores?

A. Alone, of course, it would not be satisfactory any more than—

Q. How about a combination?

A. A combination is better.

Q. In what way, combination with what?

A. Combination with lead or other pigments I have in mind.

279 Q. For instance?

A. Some inert substance.

Q. Is your objection in the regard that we have just been discussing as to zinc from western ores based upon the fact that zinc from western ores has not enough lead in it?

A. Yes, sir.

Q. Then the higher the amount of lead carried by zinc from western ores, the lesser is the objection upon that ground?

A. Yes, sir.

Q. There is one quality which paint in the shape of mixed paint should have, as I understand, that we have not yet been speaking of, and that is the quality of keeping in suspension in the can the pigments. Tell us about that, from your practical experience, so far as the statutory pigments are concerned on the one hand and the Class A pigments on the other.

A. That is a very important quality indeed, in the manufacture and sale of mixed paint.

Q. Tell us, in the first place, why it is an important quality.

A. Mixed paints being made in the factories are put up in their carrier or package.

Q. Container.

A. Container. And they are made in large batches. They are shipped all over the country and out of the country. They are sold to jobbers and retailers and a retailer is liable to and does have packages in his possession for a very long time. I have found packages two and three years old on his shelves. If the contents of that can are not such that they remain in good condition——

Q. You mean remain in suspension.

A. In suspension—when the can is opened for application,

280 the applier of the paint immediately raises an objection and a just one. It will not readily stir up again and it is very liable to be stringy and tough, if he does succeed in getting it stirred up to his satisfaction. For that reason it is one of the most important things in the manufacture of mixed paint up to the time that it is applied.

Q. How would you describe the condition which is the reverse of suspension?

A. Settling.

Q. Settling in the can?

A. Yes, sir; the pigment leaving the vehicle and going to the bottom. I am not quite sure that I finished your question.

Q. Please finish your answer.

A. You attached something to that that just occurred to me. You asked me as to that particular as applied where the statutory pigments were used. Carbonare of lead alone is one of the great offenders in the line of settling. Oxide of zinc is quite an improvement. Therefore a combination of the two is quite an improvement over the carbonare of lead alone and the improvement is in ratio to the amount of zinc we add. It is possible to make it even better by the addition of something else.

Q. That something else would be what?

A. Some inert substance.

Q. Now, then, how do the Class A pigments behave in that regard?

A. They are all better than the carbonate of lead. Some of them are better than oxide of zinc; for instance, lithopone.

Q. Have you in mind a combination between one or another of the two statutory pigments with one or another or more of the Class A pigments which would present a still higher virtue in that
281 regard?

A. I have.

Q. For instance?

A. Sublimed white lead alone is very much better than carbonate of lead alone; sublimed white lead alone is very much better than a combination of lead and zinc where the proportion of zinc is low. The zinc lead is better than any combination of the statutory pigments and the lithopone is better than any combination or any one of the statutory pigments. Therefore we have a very large latitude for making different combinations to get the results we require in reference to settling.

Q. Would these combinations that you have referred to detract from any other desirable degree of the useful qualities that mixed paint should possess?

A. They would not, excepting lithopone as applied to an outside paint for a finishing coat.

Q. Is the enamel business a considerable part of the mixed paint industry of the United States?

A. It is.

Q. What, in your opinion, as the result of your practical experience, is the value, if anything, of the Class B pigments?

A. They are a very valuable set of pigments and in many cases the paint industry could not exist without them.

Q. Tell us in what regards and for what purposes they are useful or indispensable.

A. In mixed paint many of them are, in my opinion, necessary to aid in the suspension or prevent the settling of mixed paint. In many shades of mixed paint the shade could not exist without them. In many cases in mixed paint they are essential and necessary to be put into shades to give body or consistency, to lend to the
282 working qualities of it, to give the paint a tooth and to present a surface that can be readily and easily repainted at any time.

Q. How about the quality of durability?

A. They are all very durable. Being inert, they seem to have no effect on the linseed oil and they last a very long time.

Q. Take any paint in which lead and zinc are indispensable, and assume that the statutory pigments are used for that purpose, which would you prefer, taking all qualities of paint into consideration, a combination only of the statutory pigments or a combination between the statutory pigments and one or another or more of the Class B pigments?

A. The combination where the Classs B pigments were used.

Q. For what reason?

A. They would keep better in the package*n* they would work better under the brush, they would present a better and stronger resisting surface, they could and would be readily repainted.

Q. When you speak of greater resistance, do you make a distinction between that and durability?

A. It is the same; it is durability.

Q. But there are two kinds of resistance, a resistance to physical contact and resistance to atmospheric conditions.

A. Class B pigments resist in both cases, provided the proper Class B pigments had been selected.

Q. Now, I believe it is generally conceded, is it not, that Class B pigments, generally speaking, have little hiding power?

A. That is true.

Q. How about their protecting quality?

A. That is their strong feature.

283 Q. How do they compare in protecting value with the value of the statutory pigments?

A. They are better. For instance, I made experiments with a number of the Class B pigments, grinding them, mixing them with linseed oil and comparing them on an exposure test, paying no attention to the hiding powers, and they outwore the statutory pigments.

Q. How much?

A. In the case of carbonate of lead, in this particular test, my twenty-seventh examination of the carbonate of lead disclosed the fact that the carbonate of lead was chalking at that period. I mean by the twenty-seventh examination that under this test I examined every month, every thirty days. Twenty-seven months after application the carbonate of lead, a good brand, was chalking, Barium sulphate, natural barium sulphate, barytes, showed no indication; silica showed no indication; calcium carbonate, white primer—I have in mind white primer at this——

Q. White mineral primer?

A. White mineral primer.

Q. Coming from Wisconsin?

A. Coming from Missouri; I believe it is Missouri; I don't know the address of the firm—and gypsum, showed no indications of chalking. My paint film had a distinctive gloss. The paint film of the carbonate of lead sample had no gloss; it rubbed off with my hand and discolored clear water. I made those examinations by rubbing my hand over the surface then taking clear water and a soft sponge, rinsing the sponge out thoroughly, squeezing it as dry as I could with my hand rubbing it over the surface of the paint,

284 putting it back into the vessel containing the water and rinsing it out, getting a discoloration of the water, clearly indicating chalking.

Q. So that we may get this feature clearly before the court: Assume a mixed paint of one of the Class B pigments, and let us take for that illustration barytes with linseed oil, giving the mixture the proper consistency and applying it on a surface, say white pine.

Suppose there was a pencil mark or some other black spot on the surface. I assume that if this mixture were painted over that surface the black mark or the pencil mark would shine through: is that correct?

A. It would shine through the barytes.

Q. That is what I am talking about; I was talking about a mixture of barytes and linseed oil.

A. I understand you, sir.

Q. Would the pine board, however, be protected by that coat against the destructive influence of atmospheric conditions?

A. It would.

Q. So far as this protecting quality, then, is concerned, what is your opinion as to the comparative value of the Class B pigments with the statutory pigments?

A. It is very superior.

Q. Now, if you have on the one hand a mixed paint made of the statutory pigments and a proper vehicle and, on the other hand, a mixed paint made of the statutory pigments and one of the inert pigments and the same vehicle, which would you prefer, provided the proportion is correct, and I am going to go into that in a moment.

A. I would prefer the paint containing the class B pigment, or the barytes as you have distinctly mentioned in this particular case.

Q. Given a proper proportion of one or another of the Class B pigments in that mixture, would you detract from the de-
285 sirable degree of opacity?

A. You would not.

Q. Up to what percentage would you consider it safe to go in adding a Class B pigment without detracting from the desirable degree of opacity or without detracting from any other useful quality of the paint?

A. And use both of the statutory pigments?

A. Yes.

A. Equal parts of the three.

Q. You mean one-third of each of the three?

A. Yes, carbonate of lead, oxide of zinc and the Class B pigment.

Q. Of course, so far as the settling in the can is concerned, you might prefer another Class B pigment to barytes?

A. In some cases.

Q. Is the protecting feature of paint regarded as of less importance than the hiding feature of it?

A. No, sir.

Q. You regard those two as equally important features?

A. I regard the protective feature as being the most important for the reason that if our property, buildings or structures are not hidden just as much as we might desire, it is certainly important that it should be protected; otherwise the value of our property would decrease, and, if it is protected, our property is not going to deteriorate, and, as far as hiding power is concerned, we can repaint at any time if we like.

Q. So far as the hiding quality of the paint is concerned, has that

to do so much with protecting the integrity of the substance painted as it has to do with beautifying its appearance?

A. I believe I have got your meaning, and yet I am not quite sure.

286 Q. When you speak of the hiding quality of paint, what is the ultimate object accomplished when that hiding quality exists? Is it, in the first place, the beautifying or the appearance or is it the protection of the integrity of the substance covered over by the paint?

A. No, it is simply a question of beautifying.

Q. Now, then, if a paint is subject to the defect of comparatively early disintegration, would it, when it once gets into the process of disintegration, serve the purpose of beautifying?

A. No sir.

Q. In one of your answers to my questions, Mr. Lane, you stated that the Class B pigments are indispensable in the manufacture of certain colors of mixed paints. Please enlarge upon that and tell us what class they are and give us your reasons for this conclusion, and please take the color card introduced as an exhibit with these depositions, as Exhibit A, and tell me which colors could not be produced except by using some of the Class B pigments.

A. Bottle green on the first row. Now, let me ask a question. Did you say "some of"?

Q. One or another; I don't know which.

A. Yes, yes, some of. Bottle green, golden olive, vermilion, red, Tuscan maroon, crimson, red brown, leather brown, medium blue, blue, olive, deep sea green, *crylight* green, myrtle green, dark greed and willow green.

Q. Now, give us your reasons.

A. In bottle green, for instance, the pigment itself, to make a mixed paint of this material, would not have body enough or consistency. It is necessary to add to it something to in-

287 crease the consistency. If we added the statutory pigments or any of the Class A pigments, or any pigment which, in itself, had hiding or covering power, it would immediately change the shade and we would not have that shade.

Q. The shade would be modified?

A. Yes sir, to the degree in which we added the Class A or statutory pigments.

Q. In what direction would it be changed, would it become lighter or darker?

A. Lighter.

Q. And it would become the lighter the more you added of these opaque white pigments.

A. Yes sir.

Q. In this particular case of bottle green, what percentage of the pigment in the mixed paint would have to be furnished by one of the Class B pigments, or by Class B pigments?

A. From 75 to 80 per cent. of that particular shade.

Q. You mean taking the tinting color as standing for twenty or twenty-five per cent.?

A. Yes, sir.

Q. The rest, or 75 or 80 per cent. of the body would have to be furnished by——

A. All the pigments, yes sir.

Q. All the pigment body would have to be furnished by Class B pigments?

A. Yes sir.

Q. Which Class B pigment would you use for that purpose to the best advantage, or is there no preference?

A. I have a preference, but the preference in that particular shade consists of three of them. I would use barytes, I would use a little china clay, about two per cent., and I would use from five to eight per cent. of calcium carbonate. I believe all paint men will bear me out in that.

288 Q. Are there some shades, either those that you have mentioned or others, wherein the statutory pigments are excluded for another reason than that they would modify the color?

A. Yes sir.

Q. Namely?

A. On this card, sky blue, medium blue and blur. Turquoise blue should not contain one of the statutory pigments, but whether it has in this case I am not prepared to swear.

Q. How about vermillion?

A. Oh, we could not use any portion of the statutory pigments in that.

Q. How about Tuscan red?

A. The same applies to Tuscan red.

Q. How about greens?

A. The greens that—Well, I will rename the greens. *Crylight* green would contain none of the statutory pigments; myrtle green could contain none; deep sea green might contain a little; willow green a very small percentage, if any; dark green has some white pigment, I don't know that it is the statutory pigments but it has some white pigment present owing to the fact that it is a dull shade.

A. I was talking now about the exclusion of the statutory pigments.

A. Yes, Well, then, I would not exclude dark green and I would not exclude deep sea green.

Q. Now, what is that objection other than the opaqueness or color modifying property of the statutory pigments that you referred to in saying that the statutory pigments must be excluded?

289 A. Action takes place between the coloring matter and the statutory pigments, destroying the color of the material. For instance, taking the blues, this blue marked as blue on the card, to the best of my knowledge, is Prussian blue in some form, Prussian or Chinese. That would turn light in the can and when opened would be a very dismal, disagreeable looking color and would not resemble blue any more than turquoise resembles it at the present time. It would change back after being exposed to the light and air. The medium blue is a combination of ultra-

marine and Prussian, I believe. It might be all Prussian; but the same would apply there. If it is ultramarine blue, it would turn a dirty brownish cast in the package and when opened would be anything but satisfactory. Sky blue, I am quite sure, is ultramarine and that, of course, would be a dirty, brownish cast.

Q. How about vermilion?

A. If the statutory pigments were added to vermilion, we would have pink in tone and shade, in accordance with the proportion of the statutory pigments we added.

Q. I am talking about the chemical effect of the color.

A. Well, I cannot conceive why you put it in if it changes the shade but if you did put it in, it would have a settling, hardening effect, that is, if you used carbonate of lead.

Q. Well, now, in what way are greens produced?

A. By a combination of yellow and blue.

Q. Now, therefore, if the chemical action of the statutory pigments on blue prevents their use in blues, do you mean to say that their use is prevented for the same reason in greens?

A. Yes sir; the carbonate of lead would have the same
290 effect in a greater or less degree.

Q. Name some of the other colors heretofore refer-ed to by you wherein a high percentage of Class B pigments is absolutely essential to produce a mixed paint having the requisite or necessary or desirable degree of consistency.

A. High percentage; yellow, green——

Q. How much?

A. Sixty to 75 per cent.

Q. Of what, preferably?

A. Class B pigments, a combination where it is used; I prefer a combination in the greens for reasons that I have worked out. Pea green would require considerable; canary would require considerable; buff; terra cotta.

Q. I desire at the present time that you confine yourself to those colors which you heretofore have spoken of as being those wherein the Class B pigments are indispensable.

A. Well, in my opinion, they are required in these four additional colors and they should be used in those I have just enumerated.

Q. I have spoken of colors where the statutory pigments are absolutely excluded by reason of their modifying effect.

A. Oh, pardon me.

Q. And I want you to name some other of those than bottle green and tell us in what cases a high percentage of Class B pigments is necessary to give the desired degree of consistency to the mixed paint.

A. Vermilion.

Q. How much of the Class B pigment must you add there?

A. From 90 to 95 per cent.

291 *Q.* Why is it necessary to give so large a percentage of Class B pigments?

A. That vermilion is what is termed para-red, a precipitate of

paranitra aniline, made from betanaphthol and Brazil wood, a vermilion of good hiding and covering properties, but, as used alone, would be a lake and would be a red stain rather than a red paint. Therefore we must of necessity put in some inert substance to give it the proper body, to make a satisfactory coat of paint.

Q. Now, go through the list and tell us other cases where a high percentage of inert pigments of Class B pigments is necessary.

A. Tuscan red.

Q. How much is there necessary?

A. That would depend entirely upon the maker as to the percentage. Some makers might use up to 75 per cent. and others might not use so much, but a range of 60 to 75 per cent. would be a very fair range. Crimson would run high; it would run next to the vermilion; 75 or 80 per cent. The red brown would run about the same as Tuscan. The red would range from 60 to 75 per cent. The greens that I enumerated would all carry about 75 per cent., should carry about 75 per cent. of it, especially the eyglight green.

Q. Now, it being conceded that these Class B pigments are not of appreciable hiding power, what, in these colors that you have mentioned, furnishes the hiding power?

A. The material itself.

Q. The coloring material itself?

A. It is very high in hiding power.

292 Q. On the other hand, though the colors in those cases—I am now speaking of the dry tinting colors.

A. Yes sir.

Q. —— have this superabundance of hiding power, would they furnish the desired consistency?

A. No sir.

Q. Now on this color card do you find other colors than those that you have heretofore selected, in the production of which only a small portion of the statutory pigments can possibly be used and where other pigments must be used instead?

A. Yes sir. I named some of them by mistake, I understand. I will name them again. Pea green, olive, deep sea green, terra cotta, dark terra cotta and light terra cotta, seal brown, centennial brown; those are the principal ones.

Q. For what reason can you use only a very limited amount of the statutory pigments in the production of mixed paints of those shades?

A. On account of changing the shade. For instance, if we would take dark terra cotta and increase the proportion of our statutory pigments, we would then have a light terra cotta, and that is the way those two different shades were made, by adding more of the white pigments to the tinting or coloring matter.

Q. Now, then, could you use Class A pigments instead of the statutory pigments in those cases to any higher degree than the statutory pigments can be used?

A. No, you couldn't.

Q. What virtue, if any, do Class B pigments furnish to floor paints?

293 A. They add to the durability of the floor paint, whether it is used inside or outside, for the reason that they resist to a higher degree the action of the elements and the action of contact, walking, scrubbing, washing.

Q. Can as good a floor paint be made without using Class B pigments as can be made by using Class B pigments?

A. It cannot.

Q. Can as good a paint for any purpose be made without using any of Class B pigments as can be made by using Class B pigments?

A. The question is a little too broad, I think.

Q. Well, limit it in your own way.

A. Mixed paints, used inside or outside for any purpose, or floor paints inside or outside for any purpose, cannot be made as good by excluding Class B pigments as they can be made by the addition of Class B pigments.

Q. You mean, when you speak of outside floors, verandas, for instance?

A. Yes sir, verand*ad* and balconies, piaz-as, ship decks or boat decks, or any other purpose where you paint a floor.

Q. Suppose the supply of carbonate of lead and oxide of zinc were to give out absolutely; could you make as good paint with the rest of the white pigments, the pigments of Class A and the pigments of Class B, as you now can made with using the statutory pigments?

A. Yes sir, and as far as I am concerned, they have ceased to exist.

Further proceedings were here adjourned until 1:15 P. M.

294 TUESDAY, *January* 23, 1906—1.15 p. m.

MAXIMILIAN TOCH, Recalled.

Examined by Mr. ZEIGLER:

Q. When you stated yesterday that for anything you know to the contrary, there may be one-half of the prominent mixed paint manufacturers of the United States who cling to their prejudice in favor of the statutory pigments, did you mean to be understood as saying that that prejudice extended to the use of the statutory pigments to the exclusion of Class A pigments or to the exclusion of Class B pigments?

Mr. WATSON: I will interpose an objection for the reason that, as I understood counsel, no ground which was covered by the testimony of the witness yesterday was to be retraced upon his being recalled at this time, and this witness was fully interrogated, both upon the direct and cross and redirect examinations touching the matter in regard to which he is now questioned by counsel.

A. It did not extend to the exclusion of either Class A or Class B.

Q. Assuming that any one of those manufacturers would cling to their prejudice in favor of the statutory pigments as against

the Class A pigments, in your opinion is it possible that they should manufacture a complete line of mixed paints without using Class B pigments?

A. It is impossible to manufacture a complete line of mixed paints without the use of Class B pigments.

295 Q. If you were asked to name the twelve leading mixed paint manufacturers of the United States, both as to volume of business and the quality and reputation of their product, their mixed paints, which of the complainants on this case, of which I hand you a list, would have to be included in that list?

A. I would include both Heath & Milligan Manufacturing Company, The Sherwin-Williams Company; the Patton Paint Company; John W. Masury & Son; Acme White Lead & Color Works; Detroit White Lead Works; Devoe & Raynolds Company; William H. Lucas; and Harrison Brothers & Company. I might amend that William H. Lucas; I know that is not the correct name of the firm; it is John Lucas & Son, I believe.

Q. Is there an association known as the Paint Grinders association of the United States?

A. Yes sir.

Q. Are you a member of it?

A. Yes sir.

Q. Did that association have a meeting in Chicago during last fall?

A. It did.

Q. When was that meeting?

A. During November.

Q. 1905?

A. 1905.

Q. Were you present at that meeting?

A. I was present part of the time.

Q. About how many members of the association were represented at that meeting?

A. I didn't count them but I should judge there were about fifty.

Q. About how many members are there altogether in the association?

A. Approximately a hundred.

296 Q. Does it include all of the leading paint manufacturers of the country?

A. To the best of my knowledge it does.

Q. Are the Sherwin-Williams Company members of it so far as you know?

A. I don't think they are.

Q. Well, with the exception of the Sherwin-Williams Company, so far as you know, all or practically all of the leading paint manufacturers of the United States are members of the association?

A. As far as I know.

Q. Was the statute of North Dakota which is involved in this case under consideration and discussion by the association at that meeting?

A. It was.

Q. Was there any action taken in reference to it?
A. I don't know. There was an action taken, undoubtedly.
Q. Was that action unanimous?
A. That action was unanimous.
Q. Can you give us in substance, what that action was?
A. I couldn't give you the details of that action. The question was brought up at the time as to what the proper method was which should be pursued, and it was the concensus of opinion that the law or the matter be litigated in order to determine whether the paint manufacturers would be able to demonstrate that paint could be made as they, in their best judgment and knowledge, saw fit.
Q. Well, was there any concensus of opinion as to the reason why the law should be attacked?

Mr. WATSON: I object to all this testimony as being immaterial and not going to any of the issues under examination at this time.

297 Mr. ZEISLER: I will say in reply that the purpose of this testimony is to meet the possible inference which might be drawn from the cross examination, namely, that there are leading mixed paint manufacturers in the United States who believe that the mixed paint manufacturing industry can exist and comply with the requirements of the North Dakota statute without labeling their products.

A. The opinion was unanimous.
Q. What was that reason?
A. That it was impossible, under the statutes, to manufacture paint out of the statutory pigments.

298 Cross-examination.

By Mr. WATSON:

Q. Mr. Heckel, of Philadelphia, is the secretary of your asseciation, is he?
A. Yes sir.
Q. And was last November?
A. He was not.
Q. Was he elected secretary last November?
A. He was elected after the convention.
Q. He had publicly discountenanced any bringing of litigation against this law prior to that meeting last November, has he not?

Mr. ZEISLER: Objected to as not cross examination and incompetent, Mr. Heckel not being a member of the association and not being a party to this suit.

A. I couldn't answer that; I don't know.
Q. Was he present at that meeting?
A. He was present part of the time.
Q. And in the meeting did he advocate compliance with the law and take the stand that the paint manufacturers ought not to test its validity in the courts?

Mr. ZEISLER: Objected to for the same reasons as before.

A. I can't say; not in my hearing.

Q. You will not swear that he did not take that position in the meeting will you?

Mr. ZEISLER: Objected to. One thousand people could be brought here to testify that they didn't know on that subject.

A. As a matter of fact I was absent part of the time and, if he said anything during my absence, I would be incompetent to pass an opinion on it.

299 Q. Then when you had testified, in answer to Mr. Zeisler's question, that the sentiment of this association was unanimous in favor of this action, you were testifying to something that you don't personally know about, weren't you?

A. To the best of my knowledge Mr. Heckel was not present when that question was brought up.

Mr. ZEISLER: Is he a member of the association?

A. No sir.

Q. Just answer the question. (The question was read)

A. I am testifying to something that I do know.

Q. As to how much opposition there was to it and how evenly the members of this convention in the first instance stood upon this question, you don't prentent to know, do you?

A. In the first instance, no.

Q. And as to how many of them opposed it in the first instance, and whose opposition was overcome by the arguments and persuasions of the other members of this convention, you are not posted, are you?

Mr. ZEISLER: Objected to as assuming a state of facts not shown by any evidence.

A. I am not.

Q. And, as far as you know, this conversation may have been evenly divided upon the proposition when they gathered, or at different times during the discussion of the subject.

Mr. ZEISLER: Objected to as immaterial.

A. As far as I know, that may be true.

300 Q. Do you know also whether this convention had legal advise to the effect that the law was valid and constitutional and could and would be enforced by the courts?

A. No sir, I do not.

Q. This association of manufacturers is providing the funds, is it, for making this test in the courts?

A. I am incompetent to answer that; I don't know any of the details.

Q. You don't know how the expenses of this litigation are provided for, whether it is by assessment upon all of the members or how?

A. I don't know.

Q. Do you know that some of the members of that association

openly stated in the convention that they would, notwithstanding any action taken here, after this manufacture paint and put it upon the market in compliance with the law of North Dakota? Do you know that?

A. I believe that was said.

Q. So that it was not the unanimous sentiment of the convention, then, as you have already sworn, that mixed paints could not be manufactured in compliance with the law without its being labeled? You withdraw that, do you, or modify your previous statement about this?

A. No sir, I do not. I would like to explain that; that is exactly where the mistakes come yesterday. When I referred to white paint, you probably referred to all the colors, and vice versa. Now, it is impossible to make colored paint out of the statutory pigments——

Q. You have already stated that. Now, I want to know——

Mr. STERN: I object, Mr. Watson; let the witness answer.

Mr. WATSON: He is explaining ground that he has fully
301 gone into. I don't want him to repeat that; I just want him to answer my questions. You can call out any explanations that you desire.

Q. Now, is it not true, Mr. Toch, that there were manufacturers of mixed paints in that convention who openly stated in the convention that they proposed to and would continue their business of manufacturing mixed paints in compliance with the law of North Dakota and without labeling their products; that statement?

A. That I don't know; I didn't hear that.

302 FRANK A. LANE, recalled.

Cross-examination by Mr. WATSON:

Q. I believe, Mr. Lane, you stated you were thirty-five years of age?

A. Yes sir.

Q. And you have been engaged in the paint business or acquainted with the manufacture of paints since you were about 15 years old?

A. Yes sir.

Q. When did you go with the McLennan Paint Company at Buffalo?

A. In 1893.

Q. And how old were you at that time? Well, it is a matter of calculation.

A. Yes, that is all. I was twenty-three.

Q. The style of the firm at that time was McLenna & Co., was it?

A. No sir, at that time it was the McLennan French Paint Company.

Q. The factory was in Buffalo?

A. Yes sir.

Q. How many men were employed at that time?

A. When we started?
Q. Yes sir.
A. Seven, the day we started.
Q. That was in 1893?
A. Yes sir.
Q. When did you become superintendent of that company?
A. I was superintendent then.
Q. Then there was seven men under you, were there?
A. Yes sir.
Q. When did the company become McLennan & Company by name?
A. It became the McLennan Paint Company in 1902.
Q. Then it remained McLennan & French Company from
303 1893 to 1902?
A. The McLennan French Paint Company.
Q. And up to the time when the name of French went out of the firm in 1902, how largely had his business increased and how many men were employed in 1902?
A. Well, we started with the seven men, the day we started. Within a week we had extra men on. When the company was reorganized for the purpose of dropping the name of French, in as much as Mr. John M. French had never been an active member of the company, at that time of the reorganization we had on our payrolls about 135 men.
Q. What sort of paint was manufactured by this concern prior to 1894, what lines of paint?
A. A line of specialties for the manufacturing trades; that is, paints for the implement makers, paint for the wagon makers, paint for the machine builders, the novelty houses; specialties, so to speak.
Q. Had the art of covering with paint the articles which you have just mentioned progressed at that time to the point where they were immersed in a bath of paint, or was the paint applied with a brush?
A. They were dipping when I first went into the paint business in a small way, but we perfected, or at least we claimed we perfected a system of emersing in a specially prepared vat with agitators.
Q. At that time, then, this concern was manufacturing a kind of paint, for the most part, in which carbonate of lead and oxide of zinc were not very much used?
A. What time, please?
Q. In 1893 and four.
A. Oh, and prior to that we were making mixed paint.
304 Q. I thought you began making the mixed paints in 1894.
A. That is right; that is right; as a commercial product.
Q. Well, that is what I mean.
A. Yes, as a commercial product.
Q. Well, then, is it true that prior to that time the class of paint which this concern was manufacturing did not contain carbonate of lead and oxide of zinc?
A. That is not true; they did contain carbonate of lead and oxide of zinc.

Q. Then your first appearance, at least your experience prior to 1894 had to do with the preparation of paint in which the statutory pigments were employed, to some extent at least?

A. Yes sir.

Q. Now in 1893, I understood you to say, your attention was first called to sublimed white lead?

A. Yes sir.

Q. As a pigment?

A. Yes sir.

Q. You had never seen it before that time?

A. No sir.

Q. Knew nothing about it?

A. Nothing about it.

Q. Hadn't read anything about it?

A. Yes sir, I had read about it.

Q. But had never seen it used?

A. No sir.

Q. Had never made a physical inspection of it?

A. No sir.

Q. And your attention being called to it at that time, you say that you made some investigation in regard to it, did you?

A. Yes sir.

Q. And did you find any extensive body or class of literature on the subject at that time, on the chemical side of the paint
305 industry, which gave you information on the subject of its value as a pigment?

A. No sir.

Q. That literature at that time was almost destitute of any reference to it, was it not?

A. So far as I know.

Q. It was at that time comparatively a new substance in the commercial world?

A. I understand so; it is only hear say, though, as far as I am concerned.

Q. And up to that time, of course, it not having been in any general use, there had been no demonstration by actual lapse of time as to its durability as a pigment, had there?

A. Not as far as I am concerned, up until the time I met it and experimented with it.

Q. Well, that is what I am asking you; there had been none prior to that time?

A. I will not say that.

Q. You couldn't find it in the literature, did you?

A. I didn't hunt for it.

Q. Well, you didn't find it, did you?

A. No sir.

Q. You didn't have before you any materials, houses or other objects which had been covered with a paint in which sublimed white lead was an ingredient as a pigment and which had stood for a series of years, did you?

A. Not prior to '93, no sir.

Q. Then when you took the matter up in 1893 for investigation you were without aid from either the books or from a physical inspection of the test which such paint had stood, as to the durable qualities imparted to paint by the use of sublimed white lead as a pigment?

A. I was entirely in the dark.

306 Q. Now, I understood you to say that this concern entered upon the manufacture of mixed paints in 1894?

A. Yes sir, December. We didn't put any on the market until 1895.

Q. And your first attention was called to sublimed white lead in 1893?

A. Yes sir.

Q. Then such investigations and tests as you made or could make on the important equality of the durability imparted to paint by the use of sublimed white lead was confined necessarily from the time 1893 to 1894, was it not?

A. To 1895, sir; we didn't put the paint upon the market until 1895.

Q. Well, you began manufacturing paint some time before you put it on the market, didn't you?

A. Yes sir, the week before Christmas.

Q. Was the week before Christmas in 1894 the time you referred to in your direct examination when you first selected sublimed white lead as the ingredient you were going to use?

A. Yes sir.

Q. Well, didn't it take you some time after you had arrived at your decision to get together a body of it for use in your factory?

A. No sir, we had it in the factory.

Q. You had it in the factory before you had reached the conclusion that you would employ it as a pigment?

A. Before I had reached the conclusion that we would employ it as a mixed paint pigment.

Q. You had it there for other purposes?

A. Yes sir.

307 Q. Well, at the outside it could not have been more than a year and a half after you made your first investigations as to the value and quality of sublimed white lead until your concern began to use it in the preparation of mixed paints, could it?

A. No sir, it could not.

Q. Now, will you as an expert, Mr. Lane, and a man well and widely acquainted with this whole subject, state to the court, and do you wish your testimony to go to the court to the effect that, in your opinion, as such an expert, a test as to the durable qualities of a pigment which is confined to an observation of 18 months is a sufficient and proper test upon that feature of the matter?

A. I want my testimony to go to the court in that way, as compared with the other pigments or statutory pigments, that I was satisfied it had beaten it so badly that I was satisfied and our president was satisfied that it was a better pigment.

Q. The observation which you made in that 18 months, when

you were twenty-two years of age, had satisfied you beyond all question and controversy that the experience of three or four hundred years of the world is the matter of carbonate of lead and of twenty to thirty years in the matter of the value of oxide of zinc was not as satisfactory, did not show those pigments to be as satisfactory as this 18 months' observation upon your part of the sublimed white lead?

A. During those three or four hundred years I did not exist and didn't know anything about what had been done, and I simply took the findings of my own experiments and tests. I was
308 a young man and wanted to satisfy myself as to the relative values of all the pigments I could find.

Q. You had, of course, the enthusiasm of a young man, in finding anything new that was better than the old?

A. I had; there is no question about that, sir.

Q. And you felt perfectly satisfied to match the results of that 18 months of investigation against what appeared to be the unanimous conclusion, or almost unanimous conclusion of the scientific world in regard to the really valuable qualities of carbonate of lead and oxide of zinc, didn't you?

A. I did, and I had a very high opinion of the president of our company as a paint manufacturer.

Q. Well, I am asking you more about your own opinion that I am about his, because you are on the stand and he is not.

A. Well, that is my opinion.

Q. Then I understand that, upon the reaching of that conclusion by you in 1894, your company entered upon the manufacture of mixed paints, did it?

A. Yes sir.

Q. And from that time on, I understand from your testimony, sublimed white lead was used exclusively to the entire rejection of both carbonare of lead and oxide of zinc as pigments.

A. I didn't say so.

Q. Well, do you mean that in the preparation of these mixed paints after 1894 you employed the statutory pigments?

A. I employed oxide of zinc and, in some cases, I employed carbonare of lead, but not in our regular line of Onyx mixed paint.

Q. Well, if sublimed white lead in your judgment pos-
309 sessed all of the superior qualities which you have detailed to such length of your direct examination, why didn't you employ it exclusively in the manufacture of mixed paints?

A. I received specifications at times where carbonate of lead was specified; as an honest paint manufactureer I had to follow specifications.

Q. In all cases where you were manufacturing mixed paint for the paint market without specifications from an intending purchaser, did you confine yourself to the use of sublimed white lead as a pigment?

A. Excepting the time which I have mentioned in my direct testimony where we used carbonate of lead to the extent of six carloads.

Q. Them with that one exception, I understand that you did right along carry into practical effect your conclusion as to the superiority of sublimed white lead by actually so employing it?

A. That is true.

Mr. ZEISLER: Is that as against carbonate of lead or as against both carbonate of lead and oxide of zinc?

A. No, it is against carbonate of lead.

Q. Now, you did employ, however, in the preparation of this mixed paint, mixed paints such as were prepared without specifications on the part of intending purchasers, a certain proportion of oxide of zinc, did you?

A. Yes sir.

Q. And you say, as I understand you, that it was necessary to do this in order to produce valuable and satisfactory mixed paint?

A. In my opinion, sir.

Q. And in the manufacture of all of these mixed paints
310 prepared without specifications from 1894 and down, by your company, you regularly used some percentage of oxids of zinc, did you?

A. Yes sir, in the shades that we procured, of course.

Q. Well, did it make a better mixed paint to use some oxide of zinc that it would to have used sublimed white lead as the sole pigment?

A. It did.

Q. But I thought you told Mr. Zeisler a little while ago that if the production of carbonate of lead and oxide of zinc should entirely cease, in your opinion a better and more satisfactory and useful paint could be manufactured by the use alone of Class A and Class B ingredients; did you not so testify?

A. I did. Class——

Q. Then if, on the supposition that there isn't available any carbonate of lead or oxide of zinc, you can make a better paint with the ingredients in Classes A and B, what is the necessity or business sense or use of your employing oxide of zinc because it happens to be on the market?

A. In Class A we have zincs made from western ores and during all this time that I have been testifying I have had that in mind, that if oxide of zinc, as it is known to the eastern manufacturer and as it is taken evidently in the statute and in the bill, should cease to exist, zinc made from western ores would be *be* used by me.

Q. Then when you say that you have employed oxide of zinc in connection with the sublimed white lead, as a pigment in the manufacture of this mixed paint, you have not referred to this statutory pigment?

311 A. Yes, I have referred to the statutory pigments; when I said oxide of zinc might cease to exist, then I had in mind zinc from western ores.

Q. That is to say that, in case the former ceased to exist, you would employ the latter as a substitute?

A. Or if I moved from the east to the west without it ceasing to

exist. Now that I am in the West I do not use the eastern zinc oxide, I use the zinc from western ores, because I am nearer the field.

Mr. ZEISLER: And formerly?

A. Formerly I was nearer the other field.

Q. But if you were at a place in the United States where the transportation charges were the same upon each of these articles, then the statutory pigment, which is oxide of zinc produced in New Jersey, would be the better article, would it not?

A. It would not.

Q. It would not?

A. It would not.

Q. Wouldn't it be more uniform in its composition?

A. It might and it might not.

Q. Well, take it as a commercial product which appears upon the markets of the world today, and hasn't the statutory pigment a uniformity of composition which is entirely lacking in the oxide of zinc which comes from western ores?

A. It has, yes sir.

Q. Well, then, it is true that uniformity is a most desirable, not to say essential quality in a pigment, is it not?

A. Not in that case, because sulphate of lead is present and I want that pigment.

312 Q. I understood you to say that the matter of the cost of the sublimed white lead had nothing whatever to do in causing you to reach your conclusion to use it as a pigment?

A. No sir, it did not.

Q. As a matter of fact, of course, it was then and always has been a much cheaper article than the statutory pigments?

A. The word "much" is incorrectly used.

Q. How is that?

A. The word "Much," "much cheaper" is incorrectly used.

Q. It has been cheaper; I will omit the much.

A. Yes, it has.

Mr. ZEISLER: Is this quite fair, Mr. Watson? I am sure it is done unwittingly but the comparison between sublimed white lead and the statutory pigments, including oxide of zinc, is unfair because the question is as to the comparison between sublimed white lead and carbonate of lead. I understand, as a matter of fact, that sublimed white lead is more expensive than oxide of zinc.

Mr. WATSON: Well, this is only a general examination.

Q. Will you tell me, Mr. Lane, about what is the total amount of carbonate of lead which is annually produced and used in the United States?

A. I do not know.

Q. Can you tell me if it is about 200,000 tons?

A. I couldn't say?

Q. As far as you know, it might be a million tons?

A. It might, but I don't think so.

Q. Well, you keep posted, don't you, on the subject of these pigments which enter into the manufacture of paint?

313 A. I don't keep posted on the production, as long as I am sure there is enough for my uses; that is all I am interested in.

Q. You won't, from your knowledge on the subject give any estimate of the total production?

A. I couldn't do it at all.

Q. Can you tell me how much the average annual production of sublimed white lead is?

A. No sir, I couldn't tell you that.

Q. Can you tell me if from five to eight thousand tons represents approximately the total of that production in the United States?

A. I have heard that.

Q. Well, as far as your information goes, and you present yourself here as an expert upon this whole subject, is that about correct?

A. I don't know. I don't present myself as an expert upon the whole subject; I only presented myself as an expert on the manufacture of paints, not pigments.

Q. In the manufacture of mixed paints at Buffalo, in cases where specifications were not furnished to you in advance by intending purchasers, what percentage of sublimed white lead did you employ as a pigment?

A. Well, in general shades—of course if varies, you know, the darker shades had less—but in general shades where it could run fairly uniform, we used, of the total pigment present about 45 per cent. of sublimed white lead. We aimed to have it 45 per cent. It would vary a little, owing to the fact there was some coloring matters in it.

Q. How much oxide of zinc?

A. About 35 per cent.

Q. I understood you to say that these six carloads of carbonate of lead were purchased while you were abroad?

A. Yes sir.

Q. And you found it stored in the warehouses of the company.

314 A. Part of it, and a part of it had not been delivered; a part of it came almost immediately afterwards.

Q. It was bought in a job lot, was it?

A. I think not.

Q. You said that it was such a poor quality of lead that, upon a mere physical examination of it, you discovered its poor qualities, did you not?

A. Yes sir.

Q. It didn't require any chemical examination to show how poor it was in quality?

A. No, it didn't. When I ground it, it showed it. It ground badly, didn't give me a good result, was not pleasing to me, was not satisfactory, in other words.

Q. And you advised against its use?

A. I did.

Q. You were accustomed, of course, to handling carbonate of lead?

A. Oh, yes.

Q. You had used it for other purposes?
A. Yes.
Q. In making other colors of paint, you always had some of it on hand?
A. Always had some on hand.
Q. And you knew this batch of lead to be poor in quality when you examined it?
A. As compared with our sublimed lead, I considered it very poor.
Q. Well, as compared with other carbonate of lead, wasn't it poor?
A. No, it was fair.
Q. It was what you would call a fair quality of carbonate of lead, was it?
A. Yes sir.
Q. Was it what you would designate as commercially pure carbonate of lead?
A. No question about that at all.
Q. No question at all?
A. Oh, no.
Q. It was commercially pure?
A. It was commercially pure.
315 Q. But the defects which it possessed, then, were not so much those which were inherent to carbonate of lead as they were those which arise in comparison with sublimed white lead; is that what you mean?
A. Well, it was a physical defect, not a chemical defect. The laboratory's reports indicated it was all right, but it was a physical defect.
Q. And you advised against its use at all, as I understand you?
A. I did, yes sir.
Q. And afterwards, over your objections and protest, you were ordered to use it? That is what I understand you to say.
A. I didn't make any protest.
Q. Well, you were ordered to use it?
A. I was ordered to use it, yes sir.
Q. And you were overruled on that subject?
A. I was.
Q. And it was put out in the market and came back with all those complaints?
A. Yes sir.
Q. Well, now, Mr. Lane, in the preparation of mixed paints in which that batch of carbonate of lead was employed, were there any of the ingredients which are found and mentioned in Class B?
A. No sir. In Class B? Yes sir, in Class B.
Q. Do you know which of these ingredients mentioned in Class B were used in the preparation of that lot of mixed paint?
A. Yes sir.
Q. What ones were they?
A. Silica and barytes and calcium carbonate.
Q. What percentage of silica was used?
A. In some of the shades, up to thirty per cent.
316 Q. Was that the highest percentage of silica that was used in any of the batches?

A. I don't remember of using a higher percentage of silica for any purpose than that.

Q. What percentage of barytes was used?

A. Up to 25 per cent.

Q. What percentage of carbonate of calcium was used?

A. Up to 33 1/3 per cent. in some cases.

Q. In that instance what did this carbonate of calcium consist of, was it lime or what was it?

A. That was English Cliffstone.

Q. Which is ordinarily called chalk; that is the common name for it?

A. Yes sir.

Q. Sometimes called whiting, is it?

A. No, not that grade. They don't usually give the designation of whiting to that grade. It is the washed product.

Q. Are there any cheaper forms of this calcium than the chalk which you used in that?

A. Yes sir.

Q. There are some a little cheaper than that?

A. There are.

Q. What was the value per pound of this chalk which you used on this occasion?

A. It was seventy-eight cents a hundred at that time.

Q. That would be about a little less than eight tenths of a cent per pound?

A. Yes sir.

Q. You say that, in some cases of this mixed paint, you used up to thirty per cent. of this calcium carbonate?

A. Yes sir.

Q. Mr. Lane, in the judgment of a good many paint manufacturers, I mean paint manufacturers of a high grade, wouldn't the admixture of silica and of calcium and of barytes in a mixed
317 paint in the percentage which you have just testified, be enough to damn that paint?

A. If they were all put in together, yes.

Q. Well, wouldn't an admixture of any one of these three ingredients in the percentage in which you testified be enough to, in the estimation and opinion of a great many of the best paint manufacturers of the United States, very seriously impair, if not almost destroy its value as a paint?

A. No sir, that wouldn't, in the cases where I put it.

Q. It is true, is it not, Mr. Lane, that there are at this time a great many adulterated paints upon the market?

A. Unfortunately it is true.

Q. And they are to be found wherever mixed paints are offered for sale at retail, are they not?

A. I believe so.

Q. You wouldn't find a place in the United States today where paint is offered for sale at retail where you wouldn't find more or less of these adulterated products, would you?

A. I don't think they have overlooked any place.

Q. And in the preparation of these so-called adulterated paints that we have just been referring to, what are the articles or ingredients which are most commonly used as adulterants?

A. Oh, calcium carbonate in their different forms, calcium sulphate in its different forms, barium sulphate——

Q. That being barytes?

A. Barytes, and silica, oh, and some others mentioned——

Q. Yes, but the three ingredients which you have just mentioned as having been employed by yourself in the manufacture of mixed paints in which this poor quality of carbonate of lead was
318 used, are the three that are today most generally employed as adulterants in the production of mixed paints, are they not?

A. They are.

Q. It would be silica and barytes and carbonate of calcium?

A. Yes sir.

Q. Now, will you tell us why it is that these three ingredients which you have just mentioned are particularly valuable for use—I mean valuable not to use, in a proper sense—by manufacturers who are endeavoring to *prepetrate* a fraud upon the public by the use of adulterants in the preparation of their mixed paints?

A. Well, I think when the manufacturer is endeavoring to perpetrate a fraud, since you put it, he naturally looks for the cheapest pigment he can find.

Q. Then it is because those three pigments are very cheap, is it?

A. The cheap grades are extremely cheap.

Q. And can you find anywhere in the commercial markets of the world any other substances which lend themselves as readily to the perpetration of fraud in the manufacture of mixed paints, in the matter of the use of adulterants, as these three which you have just specified?

A. I have not found them.

Q. Of course, when they are used as adulterants in the preparation of these mixed paints, they are used as substitutes for something better, aren't they?

A. When used as an adulterant, yes.

Q. And they take the place, for instance, of the statutory pigments, if the manufacturer was one who has used the statutory pigments, do they not?

A. He uses them for adulteration, yes.

319 Q. Or, if the manufacturer was accustomed to employ sublimed lead as the principal pigment, then he would use one of these three as the principal adulterant for that pigment, would he?

A. If he wanted to adulterate, that is what he would use.

Q. And if he was accustomed to use a zinc prepared from western ores as the principal pigment, then he would use one of these three as the adulterant, would he?

A. Yes.

Q. And if he was accustomed to use *pithopone* as the principal pigment and wanted to adulterate, he would employ one of these three articles, would he?

A. Yes sir, very likely.

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Q. Now, can you specify any valuable or important ingredient of mixed paint for which any of the statutory pigments are used or could be said to be used as adulterants?

A. Yes sir.

Q. Well, what are they?

A. If a manufacturer would use carbonate of lead for blue shades of mixed paints, he would adulterare it.

Q. Well, that would be because, as you say, you cannot prepare blue paint with the use of carbonate of lead, wouldn't it?

A. Yes sir, and because it is cheaper than Prussian blue.

Q. And because, in your opinion——

A. It is decreasing from the value of it and its valuable properties.

Q. Because, in your opinion, the sublimed white lead should be used always where blue is to be produced as a color; that is true; isn't it?

A. Yes, that is true; or zinc and one of the third pigments, one of the Class B pigments.

Q. You wouldn't say, as a paint expert, would you, Mr. Lane, that in the trade of manufacturing mixed paints, either of the
320 statutory pigments was commonly adulterated?

A. I don't quite get your meaning.

Q. Well, I mean this: You wouldn't say that, in the manufacture of mixed paints, either carbonate of lead of oxide of zinc, which have been called here the statutory pigments, are those used in lieu of and in place of some other pigment and are so used as an adulterant?

A. Not commonly, no sir.

Q. In other words, the adulteration of paints, as it is known in the trade today, consists in the use of silica and barytes and carbonate calcium?

A. Because they don't change the shade.

Q. Well, just say yes. That is true, isn't it? You didn't answer the question.

A. Yes.

Q. Turning to page 590 of Prof. Ladd's bulletin, No. 67.

A. Yes sir.

Q. In No. 10 that article of paint appears under the designation of Globe White Lead, does it not?

A. Yes sir.

Q. You observe that, among other things, it contains 76.28 per cent. of barytes?

A. Yes sir.

Q. You wouldn't call that Globe White Lead, would you?

A. No sir.

Q. What is the outside percentage of barytes which, in your opinion, can be used in the preparation of a mixed paint without subjecting it to the stigma of being adulterated?

A. In the light shades passing 30 to 33⅓.

Q. Is there any class of mixed paint which, in your opinion, will admit of the employment of more than 30 per cent. of barytes without making the paint itself impure and without very seriously
321 impairing its qualities as a paint?

A. Oh, yes, there are a number.

Q. Well, what is the highest percentage which, under any circumstances, can be safely used of barytes?
A. 95 per cent.
Q. What kind of paint would that be?
A. That would be a paravermilion.
Q. Take sample No. 12, Park White Lead, containing 75.72 per cent. of barytes, 5.89 per cent. of calcium carbonate and .67 per cent. of silica; you wouldn't call that white lead, would you?
A. No sir.
Q. And does that constitute a fraud, in your opinion, upon the public, upon the purchaser of paint, when such an admixture as that is exposed for sale under that label?
A. As white lead?
Q. Yes sir.
A. Yes sir.
Q. And is the same thing true of No. 24, American White Lead, PRemium Brand?
A. Yes sir, in my opinion that is a fraud.
Q. And is the same thing true of No. 52?
A. No, in my opinion, it is not.
Q. You think the employment of 27 per cent. of barytes there would not expose it to that criticism?
A. No sir, if it wasn't sold as pure carbonate of lead, if they didn't label it pure carbonate of lead, I wouldn't consider that a fraud.
Q. You are the superintendent, I think, of the Patton Company?
A. No sir, I am not?
Q. What is the position you hold?
A. I am manager of manufacturing trades.
Q. Well, as such manager, you determine, in a large sense,
322 I mean, the selection of pigments, of ingredients for your mixed paints?
A. No sir.
Q. You haven't anything to do with that?
A. Nothing to do with the mixed paint whatever, I do not know the formulas of the Patton Paint Company's goods.
Q. Well, of course, you are a great believer in sublimed white lead as a pigment, aren't you?
A. I am.
Q. And you have detailed here the most serious objections which, in your opinion, exist against the use of carbonate of lead?
A. Yes sir.
Q. Its poor qualities, as you have set them out at length in your testimony.
A. Yes sir.
Q. Well, of course, you are aware that your employers are using the carbonate of lead quite largely in their productions, are you?
A. I understand so, in their mixed paints.
Q. No. 39, page 593.
A. Yes sir.
Q. Now, in the preparation of that paint, the Patton Paint Company, of which you are the manager of manufacturing trades, em-

ployes 26.14 per cent. of carbonate of lead and 56.64 per cent. of zinc oxide, does it not?

Mr. ZEISLER: Objected to as not being cross examination, this being entirely immaterial and incompetent, the witness having stated that he does not know the formulas of the Patton Paint Company's mixed paints.

A. It is so alleged in this Bulletin No. 67.

Q. Well, from your general knowledge of the business of the Patton Paint Company, you must know that they employ large
323 quantities of carbonate of lead and oxide of zinc in the manufacture of mixed paints, don't you?

A. Yes, they do.

Q. That is a policy which, in your judgment, must necessarily result in putting out upom the market an exceedingly inferior and poor quality of mixed paint, isn't it?

A. I didn't say so.

Q. Haven't you described at great length that pur- carbonate of lead, alone or in combination with oxide of zinc, will produce a satisfactory paint?

A. I didn't say it would produce a satisfactory paint.

Q. Haven't you said that, at the expiration of 18 months of observation, the results which the combination of those two pigments produce were so poor in contrast with the results which came from the employment of sublimed white lead as a pigment, that you hadn't any doubt whatever where the superiority lay?

A. I did. The Patton Paint Company are using silica, Class B pigments, and improving their paint thereby.

Q. But haven't you already said, in your direct testimony, that the use of silica with sublimed white lead would be much better and would produce a much more valuable paint that when used with carbonate of lead as the principal pigment?

A. I did.

Q. Then, to your knowledge, the Patton Paint Company, is putting out upon the market in its mixed paints what you know, as the result of your investigation, to be a much inferior product than it would be if they employed sublimed white lead?

A. I didn't say that. They would make it better by using sublimed white lead.

324 Q. Have you advertised to the world generally that your company was putting out what you regarded as a somewhat inferior product?

A. Inasmuch as I have nothing to do with the sale and manufacture of mixed paint, I have said nothing, advertised or otherwise.

Q. Have you endeavored, in your capacity as an officer of this company, or manager of one of its departments, to induce them to drop the use of carbonate of lead and substitute the use of sublimed white lead?

A. I have.

Q. And so far you haven't succeeded?

A. I am succeeding.

Q. But you haven't succeeded yet to the point of convincing the responsible officers of your company that it is desirable for them to drop out carbonate of lead, have you?

A. The responsible officer of our company is a very busy man and isn't present at the factory one-half of his time.

Q. I ask the witness to answer the question.

(The question was read.)

A. Not wholly.

Q. And if the analysis which is found in No. 39 of this bulletin is correct, your company, when this particular sample or kind of paint was put out, was using 26.14 per cent. of carbonate of lead?

A. Yes sir.

Q. And wasn't using any sublimed lead whatever?

A. Not in that sample, no sir.

Q. Is the Patton Paint Company putting out at this time upon the market any mixed white paint in which sublimed lead is used as a pigment?

A. Not under the name of Patton Sun-Proof Paint; at least I have not seen it.

325 Q. Well, do you regard Patton's Sun Proof Liquid Paint as being a superior article to any other mixed paint which that company puts out on the market?

A. Superior to any other they put out?

Q. Yes, is that their best quality of paint?

A. That is their best quality of mixed paint.

Q. And sells for more money than anything else?

A. And sells for more money than any other grade of their mixed paint.

Q. And is the one quality of mixed paint in which there is an entire absence of sublimed white lead?

A. Yes sir.

Q. I understood you to say, Mr. Lane, that the sublimed white lead was uniform in its composition and was composed substantially of 75 per cent. of sulphate of lead, 20 per cent. of oxide of lead, and five per cent. of oxide of zinc; is that right substantially?

A. Yes sir.

Q. Now, those percentages are the exact ones which are given in Prof. Ladd's bulletin and which appear upon page 582 of the bulletin, are they?

A. Yes sir.

Q. Do I understand you to agree with Mr. Toch in the testimony which he gave yesterday, that the process of producing sublimed white lead has undergone many changes and that, with time and the new discoveries and improvements that are made, that it is a good deal improved in quality over what it was at first?

A. Yes sir.

Q. And the sublimed lead which you have today upon the markets is a very different producer from what it was originally, con-

siderably better, and that improvement has gone on steadily
326 has it, for the last fifteen or twenty years?

A. Apparently.

Q. And it has grown less variable as to its constituent parts?

A. Yes sir.

Q. Well, now, is this percentage, this table of percentages which you have given and which appears in Prof. Ladd's bulletin, one which characterizes sublimed lead as produced now or is it the one which characterized it when you adopted it in 1894 in Buffalo?

A. Well, it is nearer perfect than it was then, in my opinion.

Q. You wouldn't claim that the sublimed lead upon the market at the time you investigated it and adopted it in Buffalo in 1894, was anything like as uniform in its composition as the product of today, would you?

A. No sir.

Q. Then you don't claim that the sublimed lead which you began to employ in 1894 was made up of these percentages to an unvarying degree in the different samples, do you?

A. It was not as stable as it is today; we allowed five per cent. latitude in the lead sulphate.

Q. Well, do you contradict the declamation which is given by Hurst to the effect that sublimed white lead is variable as to its constituents?

A. I do as applied to Picher Lead Company's sublimed lead.

Q. And you think that, while that may have been a correct statement in the first edition of his work, which was published in 1892, that it would not correctly describe the commercial product of sublimed lead at the present time?

327 A. Do you want my opinion on it?

Q. Well, yes, that is what I ask for.

A. I think that Mr. Hurst described a sample of American and sample of English sublimed lead; that is my candid opinion.

Q. You have nothing, of course, except mere guesswork, upon which to base that statement?

A. And the fact that I saw sublimed lead in England which was inferior to our American sublimed lead.

Q. Do you infer that Hurst, in summarizing the analyses that were made, confines his definition to the results of the examination of two samples?

A. I don't know. He gives two samples. It is evident that he tried to impress us that there was a variation: he probably selected one high and one low.

Q. But don't you know that in the text he says that, "from a considerable number of samples which have been examined," some by himself, he reaches the conclusion that it is a variable substance?

A. Yes, he says so, I believe.

Q. His language is as follows: "In composition it (referring to sublimed white lead) is very variable. It depends upon the ore from which it is made and whether anything has been added to it after the pigment was made in the furnaces described above.

The following analyses are partly from published accounts and partly from the author's own results." You don't take it from that language that the general statement of the text in regard to the variation of the component parts of sublimed white lead is confined to the analyses derived from these two paper samples, do you?

A. He has covered a broad field.

328 Q. Just answer the question.

A. It is taken from people's say-so, rounded on his own admission.

Q. What I ask you is whether the text book does not imply that his conclusion is based on other analyses than the two that are there referred to?

A. Yes sir.

Mr. ZEISLER: The language that is quoted by counsel is followed immediately by those two analyses only: is that right?

A. That is right.

Q. Now, in the prefatory note in the third edition, Mr. Hurst says, Advantage has been taken of the demand for a third edition of this book to add to it in several places, with a view of bringing the subject matter up to date," etc. Now, as a scientific authority upon the subject concerning which Prof. Hurst is writing, would you not understand from that that, if later investigations and analyses of sublimed white lead had shown that the product now in existence or offered upon the market when this third edition was written had become less variable in its composition, the author would hace corrected the third edition to show that fact?

Mr. ZEISLER: Objected to as immaterial, incompetent and argumentative.

A. If he had made analyses, yes.

Q. The zinc lead white concerning which you have testified is a product which is made exclusively by the United States Smelting Company, is it?

A. I believe so; I am not sure.

Q. Then, as an article of commerce it is as completely within the grip of one trust as one of the witnesses for the com-

329 plainants has mentioned carbonate of lead as being in the grip of another trust?

A. I suppose so.

Q. Is it not true that both zinc lead white and also zinc made from western ores are both variable in their composition?

A. It is to a certain limit.

Q. Depending, of course, upon the nature and quality of the ores which were being smelted when the product was taken out?

A. I understand that is the rule.

Q. Can you give the approximate amount of lithopone which is produced and consumed annually in the United States?

A. I have no idea.

Q. You testified at a good deal of length in regard to what you called the impossibility of producing mixed paint so as to give cer-

tain tints or shades of colors found upon the Exhibit A, haven't you?

A. Yes, sir.

Q. And you have pointed out the particular shades upon that exhibit which you say could not be produced by the employment of the statutory pigments?

A. Yes, sir.

Q. And that, in your opinion, in order to produce those colors, it would be necessary to employ some of the ingredients of Class B, some one or more of the ingredients of Class B?

A. Or oxide of zinc and Class B. And some with pigments of the Class B to the exclusion of the statutory pigments entirely.

Q. You would find it necessary to exclude the carbonate of lead but not the oxide of zinc?

A. In some few cases, yes, sir.

Q. I understood you to say that the affinity of carbonate of lead for the coloring matter was such that, using the lead, you
330 could not produce a blue paint. I may not have quoted you correctly, but just give that definition for me again, will you, please?

A. I stated that the peculiar properties of the lead were such that it could not be used in blue tints which I mention in Exhibit A.

Q. That doesn't include all blue tints, does it?

A. Oh, it might be used in a very delicate blue, if the manufacturer was not particular as to its changing a little.

Q. Will you just please look at sample No. 8, on page 590 of Prof. Ladd's bulletin, at the bottom of the page. That refers to a mixed blue paint, does it?

A. It is so printed.

Q. Manufactured by the Armstrong Paint Company of Chicago?

A. Yes, sir.

Q. You know that company, do you?

A. Yes, sir, I know of them.

Q. Are they a reputable company?

A. They are a small company.

Q. Well, a small company might be reputable, I suppose?

A. Yes, that is possible, of course.

Q. Well, is this a reputable company?

A. I suppose so.

Q. Well, if you could be any more definite in your characterization of the standing of this company, I would like to have you give it.

A. Well, I think they are; I know nothing against the company.

Q. Well, you observe in that analysis that, using 13.68 per cent. of carbonate of lead in combination with 25.08 per cent. of oxide of zinc and other ingredients, they claim to have produced a blue paint?

A. The lead is "calculated as white lead."

331 Q. Well, that same designation is used in all of these analyses, is it not?

A. Yes, most of them.

Mr. ZEISLER: As a matter of fact, in the analyses made, Mr. Watson, we can show distinctly that, for instance, in the analysis, by Mr. Ladd of Bradley & Vrooman's paint, lead is there stated to be as "lead calculated as white lead," when, as a matter of fact, it was sublimed lead.

Mr. STERN: And all the leads, all the way through here, are called "calculated as white lead," without any particular reference as to whether they were or were not. Calculating them white lead doesn't make them white lead.

Mr. WATSON: Well, we have all the endorsement of Prof. Ladd's analyses that we want.

Q. Knowing the Armstrong Paint Company as you do, and their standing in the commercial world as a reputable firm of paint manufacturers, you would not denominate this paint appearing under No. 8 as a fraud upon the public, would you?

A. I consider it a poor paint, on account of using blue with the lead carbonate.

Q. Well, would you consider that there was too much barium, too much barytes there in that paint?

A. In conjunction with the carbonate of calcium, yes.

Q. The presence of more than sixty per cent. there of calcium and barytes would expose it to the charge of being an adulterated paint, wouldn't it?

Mr. ZEISLER: Objected to as assuming that there was 26 and over per cent. of barium sulphate, when the analysis upon its
332 face shows that the 26 per cent. is the common percentage for barium sulphate and color.

A. If it is present, yes.

Q. Well, assuming this analysis to be correct, you would say that it is a case of adulterated paint, wouldn't you?

A. I would.

Q. And calculated to be fraud upon and to deceive the public?

A. Provided that that 26.31 is largely barium sulphate. If it is 26.31, largely blue, it is a fair grade of paint, but a fugitive paint, changeable in color.

Q. Then you would have to withhold your final opinion of the character of this concern until you learned the proportionate component parts of the barium sulphate and color, would you? You couldn't reach a final judgment on that subject until you knew how much barytes and how much color was in that fourth ingredient?

A. Yes.

333 Redirect examination.

By Mr. ZEISLER:

Q. We have heard so much of Mr. Hurst as an English authority on paint chemistry; will you tell us, if you know, who are generally recognized as the leading paint chemists of the United States?

A. Dr. Dudley, of the Pennsylvania Road; Dr. Maximilian Toch of New York, and Mr. Hooker of the Heath & Milligan Company

of Chicago, most paint men generally who know recognize those three gentlemen as being the leading paint chemists of the United States.

Q. You were asked something about the cost of sublimed white lead as compared to the cost of the statutory pigments and you said that the cost of sublimed white lead was not much less than the cost of carbonate of lead, but we have yet to hear as to what that difference is. Will you tell us?

A. My last purchases, there was a quarter of a cent oer pound difference.

Q. Which was the costlier?

A. Lead carbonate.

Q. Now, compare the cost of sublimed lead to the cost of oxide of zinc?

A. Sublimed lead is higher priced.

Q. What is the difference in price?

A. From one-half to three quarters of a cent.

Q. Naturally, therefore, oxide of zinc is considerably cheaper than carbonate of lead?

A. Yes, sir.

Q. A difference of one cent?

A. About a cent. You, of course, understand, Mr. Zeisler, that there are higher priced zincs, that we are talking of com-
334 mercial zinc, used generally by the paint trade. French zincs run up very much higher than the carbonate of lead, and, on the other hand, what is known as lead runs higher than the commercial product of white lead.

Q. I was speaking of the New Jersey product, good grades of the New Jersey zinc product.

A. That is cheaper than the carbonate of lead and cheaper than the sublimed white lead.

Q. And, qualities being relatively the same, would you say that there is a difference of about one cent between the price of carbonate of lead and the price of oxide of zinc?

A. About that.

Q. I understood you to day that, up to a certain percentage, oxide of zinc may be used as a mixture with carbonate of lead and will improve the quality of the paint; is that correct?

A. Yes, sir, that is correct.

Q. Therefore, in spite of the fact that a lower priced article is mixed with a higher priced article, still that admixture produces a better effect than the use of the higher priced article alone?

A. In that case, yes, sir.

Q. If more than the proper amount of oxide of zinc is added to carbonate of lead, that surplus does not add any useful quality to the paint, does it?

A. No, sir, and it is an adulteration, in my opinion.

Q. When you speak of adulteration, do I understand you correctly as meaning that, when an article which has useful qualities is used in a greater percentage than is justified by the legitimate purpose

for which that article may be used, as to that excess there is an adulteration?

335 A. That covers the term "adulteration," as I understand it, irrespective of what it is.

Q. Has that anything to do with price?

A. No, sir.

Q. Then, when you speak of adulteration, you mean the addition of something which detracts from useful qualities?

A. That is adulteration.

Q. Anything which impairs the proper quality is then, in your opinion, an adulteration, is it?

A. Yes, sir. Going further, if you put in too much linseed oil, which we all recognize as being a very excellent article, that, in my opinion, is an adulteration.

Q. You can add bulk to your paint easily with linseed oil, can you not?

A. Oh, yes.

Q. And when paint is used by the gallon, then a surplus of linseed oil would be to that extent, as to that excess, an adulteration, would it not?

A. Yes, sir, and in reality a fraud, selling linseed oil as mixed paint and demanding mixed paint price for it.

Q. Linseed oil is very much cheaper than good grades of mixed paint?

A. Oh, yes.

Q. Have you ever known of a case where sublimed lead was used intentionally in excess of the proper amount usable, for the purpose of detracting from the quality of the paint, or as a means of cheapening it?

A. No, sir.

Q. Have you ever known of such a case as regards zinc lead white?

A. Yes, sir.

Q. Under what circumstances?

A. Used to excess as an outside paint.

336 Q. Have you ever known of a case where carbonate of lead was used in excess of the proper quantity, percentage?

A. Yes sir.

Q. In that case would you, under your understanding of the term adulteration, consider that an adulterant?

A. Yes sir.

Q. Then, as I understand your understanding of the term adulteration, as used by counsel in his cross examination, anything, no matter what it may be, if it is used in excess of the proper proportion, is adulteration?

A. Yes sir.

Q. On cross examination you were asked what a manufacturer would use for the purpose of adulteration, if he used as a part of his sublimed white lead and you said that he would use three certain pigments which you have mentioned, namely, barytes, calcium carbonate and silica. I will ask you the following question: If the manufacturer in his mixed paint used carbonate of lead or oxide of

zinc or a combination of these two as his base, what, then, would he use if he desired to adulterate?

A. He would use the same pigments, or some of them. I didn't confine myself to three pigments. The lawyer on the opposite side mentioned those three and I said they were common.

A. And so far as the ability to adulterate is concerned, if a manufacturer was so disposed, there is no difference between using carbonate of lead and oxide of zinc on the one hand and using Class A pigments on the other hand, is there?

A. None that I can see.

Q. You spoke of mixed paints wherein you used 45 per
337 cent. of sublimed lead and 30 per cent. of oxide of zinc, did you not?

A. Yes sir.

Q. In what kinds of mixed paints would you use that kind of a base?

A. In the light shades and, in fact, in the white.

Q. Would you use that in any but the whites and the light shades?

A. I would use the same combination but their percentages would differ as I added the tinting colors.

Q. You mean the proportion between sublimed lead and oxide of zinc would be as 45 to 30?

A. That is it.

Q. But you don't mean to be understood as saying that in all your mixed paints the pigment part would always contain 45 per cent. of sublimed lead and thirty per cent. of oxide of zinc?

Mr. WATSON: Objected to as leading, clearly indicating the answer expected.

A. No sir.

Mr. ZEISLER: Strike out the question, please, and I will put another question.

Q. State whether or not you intended to be understood as saying that in all mixed paints you would use 45 per cent. of the total pigment as sublimed lead and oxide of zinc to the extent of 30 per cent. of the total pigment?

A. I didn't say it and didn't intend it.

Q. Are there some mixed paints in which opaque white pigments are necessarily excluded?

A. Yes sir.

Q. In such mixed paints where opaque white pigments are entirely excluded, would you use any sublimed lead?

A. No sir.

Q. Would you use any oxide of zinc?

A. No sir.

338 Q. You wouldn't use any of the statutory pigments of Class A pigments, would you?

A. No sir.

Q. Now, speaking of that batch of bad paint.

Q. Well, pardon me; I don't believe it is correct to call it a batch of bad paint; I have no assurance that it was not seven or eight batches. It was six carloads and I don't know how much they make at a batch.

Q. I mean the entire lot produced by the carbonate of lead which you had advised against.

A. Yes sir.

Q. You spoke of using Class B pigments in the paint produced with that lot of carbonate of lead?

A. Yes sir.

Q. You spoke of using 30 per cent. of silica, you spoke of using 25 per cent. of barytes, you spoke of using 33 1/3 per cent. of calcium carbonate, or, rather, up to these percentages that I have mentioned.

A. Yes sir.

Q. State whether or not, in any one mixed paint in that lot, you used all three of these Class B pigments and, if so, what was the total of Class B pigments used?

A. There was no shade where all of them were used at the same time, and in no case did the entire amount exceed thirty per cent. when two of them were mixed together, and in no time was three of them all present at the same time.

Q. What, then was the highest percentage of Class B pigments together present in any one mixed paint in that lot?

A. Not to exceed 30 per cent. And I might state for your information that in that case, where I did go as high as thirty per cent,
339 there was no other white pigment present except the carbonate of lead under discussion; the balance consisted of French ochree and English Venetian reds, making yellow shades and making terra cotta and such other shades as that.

Q. Now, state whether you have used as large a percentage as 30 or even 33 1/3 of Class B pigments in conjunction with sublimed lead in mixed paints manufactured by the McLennan Paint Company?

A. Yes sir.

Q. In the cases where you used sublimed lead in conjunction with this amount of Class B pigments, did you experience the same bad results that you experienced in the mixed paints made of carbonate of lead and this same percentage of Class B pigments?

A. No sir. In other words, where I commenced the use of this carbonate of lead under discussion, the only change made in our standard formulas was to substitute the carbonate of lead for the sublimed lead, not changing the vehicles or the pigments in any way, shape or form.

Q. In other words, do I understand you to say that that use of this lot of carbonate of lead gave you an opportunity to compare, all other things being equal, the effect of the use of carbonate of lead with the effect of the use of sublimed lead?

A. It did, with very disastrous results unfortunately.

Q. With very disastrous results in the case of which pigment?

A. In the case of the lead.

Mr. ZEISLER: Before asking any questions in regard to the various white leads about which Mr. Watson asked questions—I am referring to six cases of white lead grouped under the title "Analysis of White Leads" on page 590 of Prof. Ladd's bulletin,—I would
340 like to ask Prof. Ladd whether those were mixed paints or whether they were what is known as white lead in oil.

Mr. LADD: Well, I wouldn't be positive, but I am inclined to think the majority of them were mixed paints, ready for use for the homes. They were in small cans and put up ready for use in the home, and are sold in the stores there as ready for use paints. I wouldn't be positive, without looking, in all cases but that is the majority of them.

Mr. ZEISLER: And the fact that they were labeled White Lead would not change your opinion about them?

Mr. LADD: My impression is that they were white paints put up for home use. I wouldn't be positive without looking up the record, but that is my impression.

Mr. ZEISLER: That No. 37, however, was not a paint put up for use?

Mr. LADD: That was not, but in the other cases, if I remember correctly, they were all put up for use with the exception of 52, which was a sample sent in to us without any label, that is, just as they were using it; that came in just as the party was using it.

Mr. ZEISLER: Was it a white paint virtually?

Mr. LADD: That was ready for us, brought in as they were using it probably, simply labeled "White lead."

Mr. ZEISLER: I mean generally as to those which you did not except. For instance, the first and second, were they practically mixed white paints?

Mr. LADD: I think they were.

341 Mr. ZEISLER: Or were they white lead ground in oil, to which the user must add the necessary oil?

Mr. LADD: My impression is—I wouldn't be positive, but my impression is that those were all ready for use in the home; yet it may have been necessary to add some oil; I wouldn't be certain about that now.

Mr. ZEISLER: For use as a white paint?

Mr. LADD: For use as a white paint, yes sir.

Q. Now, I understand you have been *association* with the concern of the Patton Paint Company only about nine months?

A. The Patton Paint Company, yes sir. My term of employment started there on the 15th of April, but I was detained and didn't report until the 17th of April.

Q. About nine months then?

A. About nine months.

Q. Have you been consulted by the managers of that concern with reference to the propriety or advisability of using sublimed white lead as a substitute for carbonate of lead?

A. As applied to what?

Q. In the mixed paints.

A. No sir, but I have spoken to our secretary and treasurer, Mr. Luddington Patten, telling him the good qualities of sublimed white lead; I was not consulted, I volunteered the information; and he immediately started an exhaustive test and those tests are being carried on today. I personnal-y have been looking at them but making no remarks to Mr. Patten, his mixed paint foreman or his chemists, simply examining them and making no remarks. That was understood amongst us that each man would retain his opinion until the final examination.

342 Q. And they have not yet told you what their determination is in regard to adopting sublimed white lead as an ingredient of their mixed paint, have they?

A. No sir, because they have not decided yet.

Q. Have you charge of what should go into the paints manufactured in your department?

A. I have absolute charge there.

Q. And what kind of an opaque white pigment do you use there?

A. I use sublimed white lead, zinc lead white, lithopone and zincs from western ores, two different kinds, one of them running low and one of them running quite high in sulphate of lead.

Q. Do you use any carbonate of lead in that department?

A. No, I have never used a pound up to the present time.

Q. Are the proprietors and general managers of the Patton Paint Company aware of the fact that you are using the Class A pigments?

A. Yes sir.

Q. Have they expressed their approval or disapproval of that practice?

A. They have expressed their approval by paying the bills for the materials I buy and at times complimenting me on the product I am turning out.

Q. Since you have served the Patton Paint Company, have you had occasion to examine the various shipments of sublimed white lead, taking samples therefrom and examining them as to their contents so as to determine the question of the variableness of composition?

A. Our chemists have done that for me under my supervision.

343 Q. With what result?

A. They were satisfactory, and I must say that the variations of sublimed white lead since I went with the Patton Paint Company has been very, very slight.

Q. Within what limits?

A. Within two per cent.

Q. Mr. Watson asked you a question as to the variableness of zinc lead white and zinc made from western ores; there was in that question no discrimination made between the two; and you answered that you found those pigments variable. Is there any difference between the degree of variableness of zinc lead white and the degree of variableness of zinc from western ores?

A. No, there isn't any particular difference. Some of the grades of zinc made from western ores, they run very low, in sulphate of

lead, and they class that by itself. Then one that runs higher, they give it another name, and the zinc lead white, of course, is another distinctive name of its own.

Q. Look at the average composition given on Page 584 of the bulletin; that refers to zinc lead white and shows a little over 48 per cent. of lead sulphate and a little over 50 per cent. of zinc oxide; does that correspond with your experience with that article?

A. That is about the way it is running now. When I first started to use it, it ran higher in zinc oxide; at that time it was running about 60 per cent. of zinc oxide, but in the last few years the two proportions of zinc oxide and lead sulphate have come closer together.

Q. Do you regard it as an advantage or a disadvantage that the amount of lead sulphate is increasing?

344 A. The product is better today than it was before when the zinc oxide proportion was higher.

Q. Now, then, what limits of variation do you find the zinc lead white which has dome inder your observation say, within a year or the last few years, to be, approximately the same?

A. Well, within 10 per cent., 5 per cent. either way.

Q. Now, then, as to zinc made from western ores, what there do you find the variance?

A. Well, I think I covered that in previous answers by the fact that they have got several grades and, take one of the grades, any one, it doesn't make any difference, we get one that runs from three to fice per cent. of lead sulphate and laboratory instructions are that that particular grade must not exceed that. The fact is that when a paint manufacturer adopts certain materials he wants them to continue about like what he adopted during the lift of his trial. If there is any change made in the pigments, he wants to be familiar with when they are made, and he takes the subject up usually at the expiration of his contract. Most of the paint manufacturers contract for a season's supply or a stipulated amount which they estimate will last them a certain period of time and, in order to save trouble and unnecessary work in testing in their laboratory department, they put limits on the constituent parts of the different goods so that it is not necessary to go into the details or absolutely correct analysis of every sample. They look for the articles which they expect to fluctuate and finding no fluctuation beyond their limit in those, and the general appearance and working quali-

345 ties being all right, it is generally accepted as being the proper goods. If at any time any question comes up as to whether it is being kept fully up to their own set standard, them a careful analysis is made in every detail and the general practice is to do that every so often anyhow, no stated time, but at intervals. That is the practice is most of the paint factories today where chemists are employed.

Q. If you found a zinc from western ores which carried a small percentage of lead sulphate and would combine that with sublimed lead, would you or would you not get desirable results?

A. Oh, yes, we get desirable results.

Q. So that if you get a zinc made from western ores which carries a small percentage of lead sulphate, there is a method of correcting the lack of lead sulphate, is there?

A. Oh, yes. We can, as a matter of fact, by combining zinc made from western ores and sublimed white lead, increase or decrease our lead values as we wish.

Q. Exactly. When you spoke of variations, did you speak of variations in various lots of the same grade or did you speak of variations as between grades?

A. I covered the zincs made from western ores, all of the grades, from the one running lowest in lead sulphate to the one running higher in sulphate. Perhaps it might be necessary, to make that subject quite clear—I can see that you haven't got it quite clear in your mind yet—we will take, for instance zinc made from western ore, running low in lead sulphate. Our margin on that would necessarily be close, two per cent. Moving up to one running 7
346 to 10 or 12 per cent. that would allow ourselves a greater variation there. Then getting into one running up as high as 50 per cent. that would allow ourselves a variation there of five per cent. either way to ten. Now, while lead sulphate is an excellent thing in the zincs made from western ores, when we select a zinc running low in lead sulphate for a specific reason we do not want it to run high. I will give you one in mind: The trunk industry in this country is very, very large. Manufacturers of trunks, I cater especially to that trade and have a good deal of trade, ship as far east as New York and west to St. Louis, to Pittsburg, Buffalo, Detroit, Cincinnati and all in and around our own vicinity. Now, a trunk is covered with canvas, when paint is used over it. A special canvas the trunk maker had made for that purpose. It is applied by means of paste, flour paste. After he has applied the canvas, that is, before any of the trimmings or ribs are put on the trunks, he then puts on a coat of the paste colored with some dry pigment to resemble some color he is going to have when the trunk is completed. That is put on with a scrubbing brush, a very crude method, one would think, but it is the correct one; it is to run the paste into the pores of the canvas and color the canvas the same color he desires, so that it will not be so difficult and require so much paint to entirely hide it. Those trunk paints are cheap products, it is not necessary to say how cheap, but they are cheap products, about half the price of mixed paint. I use zinc made from western ores at the Milwaukee factory and tint it to my desired shade and, to give it gloss sufficient to suit the requirements, I add to it a varnish con-
347 taining a considerable proportion of resin. Now, as there is more or less zinc present, zinc made from western ores—of course, depending on the shade, from a light lead color to an olive, and going into the terra cotta, and leaving that and going into the browns, which have none—we have a greater or lesser amount of zinc from western ores. If the precentage of lead were high and I were using that varnish in which I employ a resin, the paint would thicken and liver and therefore I want one low and five per cent. present; when, as a matter of fact, at no time there is over 33⅓ per

cent. of the zinc present, I have then cut the percentage of lead so that I don't get any thickening effect, but if I come up to a full per cent. I am very liable to; so that, by keeping it down very low, to a likit of one per cent. sulphate of lead precent, I will get no noticeable effect. Now, that is the reason. The specifications will necessarily be fairly close.

Q. Now, do I understand that there are some paints where, by reason of the thinning materials used, or possibly some other reason, it is desirable to have either no lead or a small amount of lead, in which cases you prefer a zinc made from western ores of a grade which carries a low percentage of sulphate of lead?

A. That is true.

Q. And in other cases where this objection to the use of lead does not exist, there you want a grade of zinc made from western ores which carries a large percentage of sulphate of lead?

A. Yes sir.

Q. Those are the variations that you refer to?

348 A. *There* are the variations that I refer to.

Q. You can have what you want?

A. I can have what I want. And there are places in my department where I want an opaque white substance that I could not use oxide or zinc or zinc made from western ores at all, because I would *het* a thickening or livering effect with the particular varnish I use in that case. It is a well known fact amongst the paint men that zinc, oxide of zinc, will not mix with manila. Manila is a very find *f*rade of gum which we import and use in making varnish and we cannot put the zinc in there, and in that case we are forced to use lithopone and do.

Q. Well, then, a different base is used in tints than there is used in whites?

A. Oh, yes.

Q. Have you become acquainted with the properties and qualities of white mineral primer?

A. Yes sir, I have used it.

Q. What is that chemical?

A. Calcium carbonate.

Q. What is your opinion of it?

A. It is a very good product for many purposes. Physically it is very different from the chalk products, that is, whiting, Paris white.

Q. Have you used white mineral primer with advantage?

A. Yes.

Q. And for what purpose?

A. For giving density to material and adding tooth or good brushing surface.

Q. How about durability?

A. Very durable.

Q. What I mean is, does it add to the durability of paint or does it not?

A. When it is used in the proper proportions, it adds.

349 Q. That is leaded zinc made at Mineral Point, Wisconsin, which is a zinc made from western ores and competitor of the Cañon City zinc lead?

A. Oh, yes.

Q. The two, then, come in competition with each other, do they?

A. Oh, yes.

350 Recross-examination.

By Mr. WATSON:

Q. These tests which I understand the Patton Paint Company is now making of the value of sublimed lead as a pigment, were the result of this suggestion which you made to the managers, that they employed it?

A. I won't say that, because they had s-rated some tests prior to my coming there, but they have made more since I have been there.

Q. About when did these tests begin, as nearly as you are advised?

A. Well, we put out a number of tests in June, quite a number of tests in June.

Q. And you have been looking at them from time to time, you say?

A. Oh, yes.

Q. And when will the tests have reached the life, or a duration which, in your opinion, will enable you to get results from them that will be satisfactory?

A. No, not that way. When, in Mr. Patton's opinion, as I am not in charge of the department.

Q. Well, how long do you expect those tests to continue before you reach results or agree upon results?

A. About two years.

Q. Now, Mr. Patton, of course, has known of sublimed lead at least as long as you have, hasn't he?

A. I should say so.

Q. And you have known of it since 1893?

A. That is right.

Q. That is twelve years?

A. Yes sir.

Q. But, up to the present time, Mr. Patton, as a manufacturer of mixed paints and especially as the manufacturer of this
351 Sun-Proof Liquid Paint, hasn't yet reached the conclusion that he may use the sublimed lead as a pigment in that paint, has he?

A. No, I think not.

Q. And therefore the wisdom or desirability of using this sublimed white lead as a pigment in that paint has not yet been sufficiently established so that Mr. Patton is ready to introduce it without himself making these personal tests, has he?

A. That is as I understand it, of course.

Q. Well, you look upon Mr. Patton as a representative paint manufacturer, don't you?

A. I look upon Mr. Patton as a very clever man, not necessarily a clever paint man.

Q. And he has been in the business a good while, has he?

A. Yes, he has.

Q. He is a highly reputable paint manufacturer is he?

A. Yes sir.

Q. A member of this association here?

A. A member of this association here, yes sir.

Q. Has been engaged for a great many years in the manufacture of paints, has he?

A. He has been associated with his brother and his father a great number of years.

Q. Are they large producers of paint?

A. Yes, quite large.

Q. Well, how large?

A. Well, I don't know the value of their output, in as much as I am not in the accounting department and not a member of the firm, naturally I wouldn't see the figures; I can make a guess for you.

Q. Are they within the class of one hundred referred to by Mr. Toch yesterday?

A. Oh, yes.

352 Q. Very well up in that class, are they?

A. Yes indeed.

Q. And of course they have been in business for a good many years, you say?

A. Good many years.

Q. How many, do you think?

A. I believe that the Patton Paint Company, under the name of James E. Patton, has been in business since '53.

Q. And, of course, like other large manufacturers of paint, they have kept chemists in their employ, have they?

A. Yes sir, late years at least, but not in early years they didn't.

Q. And, as far as you know, it has been the policy of this company to keep abreast of the time in looking into new materials which appeared upon the market, suitable or which can be adopted for use in the manufacture of paints?

A. In the last few years, yes sir.

Q. That is, you know they have within the past few years.

A. Yes sir, and only within the last few years.

Q. And their success in building up so large a business as you say they have built up would indicate to your mind, aside from any exact knowledge on the subject, that they have kept themselves well posted on the subject since they started in business, would it not?

A. Yes sir.

Q. And you therefore may fairly cite Mr. Patton and his company as an illustration of the case of at least one large manufacturer in your knowledge who, up to the present time, is not satisfied as to the value of sublimed lead in the putting out or in

the production of a mixed paint, and desires to verify the
353 conditions of others by his own personal tests?

A. Yes sir. Mr. Patton is not a paint maker, not a practical paint maker.

Q. No, but he has been making paint since fifty something?

A. He has not; he is a young man.

Q. Well, his father has been engaged in making it?

A. His father?

Q. Well, wasn't Mr. Patton raised in the business with his father?

A. Mr. Patton has only been out of college a few years, as I understand it.

Q. Then what you mean to imply, I suppose, by your remark is that the predecessor of the present Mr. Patton was a little behind the times?

A. That is agreed.

Q. That is just what you think about it, is it?

A. That is agreed.

Q. That is, it is agreed by you, at any rate?

A. And his two sons.

Q. But his son still don't accept your conclusion without verifying it by his own personal examination and test, does he?

A. No.

Q. Well, to that extent he doesn't agree with you, does he?

A. He doesn't agree with me.

Q. No, and he doesn't agree, either, so far as I can make out. He doesn't use sublimed lead, at any rate.

A. He does use sublimed lead; pardon me.

Q. Will you tell me what books, if any, have been written and published by Prof. Toch on the subject of chemistry of paints?

354 A. I don't know of any personally; I never read any.

Q. You aren't able to cite any publication of his?

A. No sir; not being a chemist, I cannot read those books intelligently.

Q. Well, do you understand, however, he has put out books upon this subject?

A. I understand he has put out a great deal of literature.

Q. Well, is it in the form of any book that we could get hold of?

A. Yes, in the form of small books and articles that could be got hold of.

Q. Articles in the newspapers?

A. Yes, and articles in the press, printed in pamphlet form.

Q. Have his articles upon this subject been gathered up? Have they been considered of sufficient scientific value so that they have been gathered up and put in permanent book form, so that we can find them anywhere?

A. Not to my knowledge.

Q. Has Dr. Dudley, to whom you referred as another one of the leading experts on this subject in the United States written any books on the subject?

A. I referred to Dr. Dudley as a paint chemist, not as an expert; I don't think Dr. Dudley would be flattered——

Q. You mentioned him as being representative in the United States in the same way as Prof. Hurst was representative in England?

A. That is right.

Q. And you don't wish it to be understood——

A. I wish it to be understood that Dr. Dudley is recognized as one of the leading paint chemists of the United States.

355 Q. But he isn't recognized so by very much of anything which he has written upon the subject, by any scientific paper which he has prepared or by any work upon the subject which we can find in any scientific or other library in the United States, has he?

A. I understand he has written many papers on the subject.

Q. Are they published in any book?

A. I don't know.

Q. Are they referred to as scientific authority in the scientific world of chemistry?

A. I don't know.

Q. Are there not eminent chemists who have made a specialty of the chemistry of paint, who have written books upon this subject and whose works we can find in scientific libraries?

A. Yes, and many who have made a study of it whom we can't find on books.

Q. Well, I didn't ask you that.

A. Well, I just volunteered that information.

Q. There are some whose works you can find aren't there?

A. Yes sir.

Q. And they are representative scientific experts?

A. They are.

Q. Their names are well known in the United States, are they?

A. They are recognized by some, yes.

Q. Who are they?

A. Well, a number of people recognize Hurst.

Q. I am asking you for men from the United States.

A. Oh, who have written——

Q. Yes sir.

A. I don't know any.

356 Q. You don't know any at all?

A. No sir.

Q. As far as any printed work is concerned, Hurst is ranked at the head, is he?

A. I guess so; I judge so.

Q. How, would you want to be understood as seriously branding the use of carbonate of lead and oxide of zinc as adulterants in the preparations of mixed paints?

A. The question wasn't put that way.

Q. Well, just answer it, please; just answer my question, if you want to be understood in that way?

A. Yes sir, if incorrectly used.

Q. Do you wish to be understood seriously as suggesting that linseed oil is used as an adulterant in the preparation of mixed paint?

A. Yes sir, I do.

Q. And you would want to be understood also, I suppose, as meaning that the manufacturer who wanted to prepare a cheap form of mixed paint and who was intending to use an excess of oil in his preparation would select linseed oil in lieu of some cheaper oil?

A. I didn't say anything of the kind.

Q. Do you wish now to be understood as saying that would be true?

A. Not in cheap mixed paint; I don't think the question of price was mentioned at any time.

Q. In the preparation of mixed paint in which the manufacturer intends to use an excess of oil in preparing it, do you wish to be understood as saying that he would select linseed oil for that excess?

A. I didn't say he would select——

Q. Tell me whether you wish now to be understood in that way.

A. He would probably select something cheaper.

357 Q. And he would likewise select something cheaper than carbonate of lead oxide of zinc in the same way, wouldn't he?

A. He might not.

Q. It would be a difference between about a half a cent a pound on the one hand, if he selected any one of the three substances which you testified were ordinarily used as adulterants, or, on the other hand, of taking carbonate of lead or oxide of zinc at a cost of 3½ to 7 cents a pound, wouldn't it?

Q. Yes.

Q. And no manufacturer who wanted to adulterate his product would be such a fool as to take the more expensive in preference to the less expensive ingredient for use as an adulterant, would he?

Mr. ZEISLER: Objected to as immaterial and argumentative, and incompetent.

A. It is hard to tell what his ideas on the thing might be. If he used straight oxide of zinc and straight linseed oil, he would make a cheap paint.

Q. Yes, but he would make a good deal cheaper paint if he used some animal oil or fish oil or mineral oil as his substitute or adulterant, rather than linseed oil, wouldn't he?

A. He couldn't even sell that.

Q. No, he ought not to.

A. He couldn't; the appearance would be against it at once.

Q. But you know there are adulterated paints upon the market today in which such oils are used; you know that, don't you?

A. I don't, no. There may be some traces of mineral oils.

358 Q. Yes, we can produce them to you all right.

A. Well, I haven't seen them.

359 Redirect examination.

By Mr. ZEISLER:

Q. Isn't it a fact that oxide of zinc is largely used to adulterate in combination with carbonate of lead, reducing the amount of carbonate of lead and substituting therefor oxide of zinc in mixed white paints?

A. Yes, that is a common practice.

Q. Do the Patton Paint Company use Class B pigments in their mixed paints?

A. Yes sir.

Q. Extensively so?

A. I don't know to the exact extent. As I say, I don't know the formula, but I have seen them coming in. However, they make one grade of paint they call Silica, Now, that is suggestive without going any further.

Q. Is it good paint, as far as you know?

A. It is a good second grade paint, sold at a reasonable price; it is not a high priced paint.

Q. But even their high grade paints contain Class B pigments, do they?

A. Yes sir.

Q. Do you sometimes see the Journal of the Society for Testing Materials?

A. Yes, sometimes see it.

Q. Have you seen articles by Dr. Dudley in that journal?

A. Yes.

Q. Have you seen articles by Dr. Dudley in the Painters' Journal?

A. Yes.

Q. Have you seen articles by Dr. Dudley on painting subjects in the Railway Journal?

A. No, I don't read the Railway Journal.

Q. Have you seen articles by Dr. Dudley on the subject of paint manufacturing in the Journal of the American Chem-

360 ical Society?

A. No, I don't read that.

Q. Have you read any articles by Dr. Toch in any of those journals that I have mentioned?

A. Yes.

Complainants rest.

361 COMPLAINANT'S EXHIBIT A.

The Heath & Milligan

LUNA ALUMINUM PAINT.

Purchase a small can of this article; apply a portion of it to your chandeliers, old lamps, moulding, or, for that matter, any article that will look well with an aluminum coating; then you will go to your dealer and purchase a larger package with which to redecorate many other things in and about your home.

It gives a soft, beautiful, silvery finish that is both pleasing and in keeping with any surroundings.

Flower pots, iron fences, lawn chairs, garden utensils and similar articles can all be made beautiful with a coat of The Heath & Milligan Luna Aluminum Paint.

It prevents rust.

H. & M. FLAT BLACK

is the article with which you can produce a beautiful wrought iron effect on any kind of a metallic surface. It is also adapted to wooden surfaces of all kinds, and the effect produced is that of black ebony.

Paint your bric-a-brac, small shelves, picture frames, chairs, beds, etc., with this article and produce a very novel effect.

Plan an entire bedroom in ebony. This is easily carried out. You can do it. H. & M. Flat Black, a brush and a little time are all that is required to accomplish this result.

H. & M. Flat Black and Luna Aluminum Paint make a beautiful combination.

SAMPLE SHADES OF *The Heath & Milligan* BEST

	APPROPRIATE TRIMMERS		APPROPRIATE TRIMMERS		APPROPRIATE TRIMMERS
OLD IVORY	WHITE TINTED WHITE LIGHT STONE	NEUTRAL GRAY	PURE DRAB SILVER GRAY PEARL GRAY	ROSE TINT	WHITE FAWN LIGHT LILAC
RYE STRAW	STRAW YELLOW DRAB LIGHT SEAL BROWN	LEMONT STONE	LIGHT LILAC PURE DRAB OLIVE DRAB	NSIDE PINK	WHITE ROSE TINT FAWN
LEGHORN YELLOW	WHITE STRAW LIGHT STONE	PEARL GRAY	WHITE BLUE GRAY LEAD COLOR	FAWN	OLD IVORY FLESH TINT LIGHT TERRA C
CREAM	WHITE LIGHT STONE BUFF	LEAD COLOR	NEUTRAL GRAY BLUE GRAY PEARL GRAY	LIGHT TERRA COTTA	WHITE FAWN LEATHER BRO
PALE SALMON	WHITE LIGHT STONE SILVER GRAY	LIGHT LILAC	WHITE PEARL GRAY LAVENDER	DARK TERRA COTTA	VIENNA DRA FAWN RED
TINTED WHITE	WHITE STRAW VIENNA DRAB	LAVENDER	WHITE LIGHT LILAC WARM DRAB	RED	WHITE NILE GREEN DEEP SEA GR
FLESH TINT	WHITE BUFF CENTENNIAL BROWN	PURE DRAB	TINTED WHITE BLUE GRAY OLIVE DRAB	★ TUSCAN MAROON	APPLY OVER RED SEE DIRECTI
VIENNA DRAB	WHITE YELLOW DRAB LIGHT SEAL BROWN	WARM DRAB	VIENNA DRAB YELLOW DRAB RED BROWN	CRIMSON	WHITE CREAM RED BRO
STRAW	WHITE YELLOW DRAB LIGHT SEAL BROWN	OLIVE DRAB	SILVER GRAY MED. QUAKER DRAB GOLDEN OLIVE	RED BROWN	STRAW CENTENNIAL FAWN
YELLOW DRAB	RYE STRAW STRAW LIGHT SEAL BROWN	LIGHT SEAL BROWN	WHITE CREAM BUFF	LEATHER BROWN	STRAW YELLOW D BUFF
CENTENNIAL BROWN	BUFF MILWAUKEE BRICK RED	GOLDEN OLIVE	OLD IVORY OLIVE RED	CANARY	WHITE LEGHORN Y YELLOW D
BOTTLE GREEN	WHITE OLD IVORY CREAM	★ VERMILION	COVER WITH A COAT OF DURABLE VARNISH	BUFF	WHITE LEGHORN Y CENTENNIAL

IN ADDITION TO THE SHADES SHOWN ABOVE WE PUT UP BLACK OUTSIDE WHITE, (GLOSS) AND INSIDE WHITE. (FLA

T PREPARED PAINT. APPLY ACCORDING TO DIRECTIONS.

	APPROPRIATE TRIMMERS
LIGHT STONE	TINTED WHITE LIGHT SEAL BROWN BOTTLE GREEN
MILWAUKEE BRICK	WHITE TINTED WHITE CENTENNIAL BROWN
LIGHT QUAKER DRAB	RYE STRAW YELLOW DRAB LIGHT SEAL BROWN
MEDIUM QUAKER DRAB	NILE GREEN LIGHT QUAKER DRAB GOLDEN OLIVE
SILVER GRAY	WHITE NEUTRAL GRAY OLIVE DRAB
AZURE BLUE	WHITE OLD IVORY DEEP SEA GREEN
GREEN STONE	WHITE NILE GREEN DEEP SEA GREEN
BLUE GRAY	WHITE OLD IVORY PEARL GRAY
TURQUOISE BLUE	WHITE FRENCH GRAY GREEN STONE
SKY BLUE	WHITE NEUTRAL GRAY ROSE TINT
MEDIUM BLUE	FOR COVES, CEILINGS, ETC.
★ BLUE	A BEAUTIFUL SOLID BLUE

	APPROPRIATE TRIMMERS
FRENCH GRAY	WHITE PURE DRAB GREEN STONE
NILE GREEN	WHITE GREEN STONE OLIVE
GREEN TINT	WHITE LIGHT QUAKER DRAB OLIVE
APPLE GREEN	WHITE OLIVE WILLOW GREEN
PEA GREEN	WHITE GREEN TINT WILLOW GREEN
LIGHT SAGE	WHITE NILE GREEN LIGHT QUAKER DRAB
OLIVE	WHITE SILVER GRAY DEEP SEA GREEN
DEEP SEA GREEN	FRENCH GRAY GREEN STONE DARK GREEN
★ CRYLIGHT GREEN	FOR WINDOW BLINDS ETC.
★ MYRTLE GREEN	FOR SASHES, DOORS ETC.
DARK GREEN	LEGHORN YELLOW APPLE GREEN OLIVE
WILLOW GREEN	APPLE GREEN CREAM DARK GREEN

★ EXTRA COLORS AND HIGHER IN PRICE THAN THE OTHER SHADES.

The Heath & Milligan

BEST PREPARED P

is the highest attainment in pai facturing. For over two score ye been recognized as the Standard America. BEST PREPARED PA bines all the features necessary in painter's paint.

BEST PREPARED PAINT is the best paint materials it is possible It is scientifically combined by heavy into a mixture embodying the m uniformity, ease of working, beauty and economy, the essentials most ne paint.

While a great amount of BEST PR PAINT is used by house owners and annually, **it is well to employ a first-cl when the best results are to be o much depends upon the proper ap paint.**

The following rule shows the estimating the quantity of Best Prep needed:

EXAMPLE:

Front	
Rear	
Side	
Side	
Multiply by average height	
Divide by	300

One gallon of Best Prepared Paint over a smo face will cover 300 square feet two coats,

THE HEATH & MILLIGAN BEST PREPARED P IN SIXTY SHADES.
ALSO IN BLACK AND WHITE AND IS P FOR SHIPMENT AS FOLLOWS:

Bbls.,	50 ga
Half-bbls.,	25 ga
5 gallon wooden buckets.	
1 gal. cans,	6 to a
½ gal. cans,	12 to a
¼ gal. cans,	24 to a

Put up in cans according to U. S. standard 231 cubic inches to the gallon.

NOTE:—Every exclusive agent for the H&M copy of our book "PRACTICAL PAINTING." tains a vast amount of practical information wh of years of careful study, experimenting and it will be found specific directions covering th paints, stains, etc. over various surfaces.

Our exclusive agent will be glad to give you any special information you may require not information on this color card.

ARED PAINT. APPLY ACCORDING TO DIRECTIONS.

	APPROPRIATE TRIMMERS
LIGHT STONE	TINTED WHITE LIGHT SEAL BROWN BOTTLE GREEN
MILWAUKEE BRICK	WHITE TINTED WHITE CENTENNIAL BROWN
LIGHT QUAKER DRAB	RYE STRAW YELLOW DRAB LIGHT SEAL BROWN
MEDIUM QUAKER DRAB	NILE GREEN, LIGHT QUAKER DRAB GOLDEN OLIVE
SILVER GRAY	WHITE NEUTRAL GRAY OLIVE DRAB
AZURE BLUE	WHITE OLD IVORY DEEP SEA GREEN
GREEN STONE	WHITE NILE GREEN DEEP SEA GREEN
BLUE GRAY	WHITE OLD IVORY PEARL GRAY
TURQUOISE BLUE	WHITE FRENCH GRAY GREEN STONE
SKY BLUE	WHITE NEUTRAL GRAY ROSE TINT
MEDIUM BLUE	FOR COVES, CEILINGS, ETC.
★ BLUE	A BEAUTIFUL SOLID BLUE

	APPROPRIATE TRIMMERS
FRENCH GRAY	WHITE PURE DRAB GREEN STONE
NILE GREEN	WHITE GREEN STONE OLIVE
GREEN TINT	WHITE LIGHT QUAKER DRAB OLIVE
APPLE GREEN	WHITE OLIVE WILLOW GREEN
PEA GREEN	WHITE GREEN TINT WILLOW GREEN
LIGHT SAGE	WHITE NILE GREEN LIGHT QUAKER DRAB
OLIVE	WHITE SILVER GRAY DEEP SEA GREEN
DEEP SEA GREEN	FRENCH GRAY GREEN STONE DARK GREEN
★ CRYLIGHT GREEN	FOR WINDOW BLINDS ETC.
★ MYRTLE GREEN	FOR SASHES, DOORS ETC.
DARK GREEN	LEGHORN YELLOW APPLE GREEN OLIVE
WILLOW GREEN	APPLE GREEN CREAM DARK GREEN

★ EXTRA COLORS AND HIGHER IN PRICE THAN THE OTHER SHADES.

The Heath & Milligan

BEST PREPARED PAINT

is the highest attainment in paint manufacturing. For over two score years it has been recognized as the Standard Paint of America. BEST PREPARED PAINT combines all the features necessary in a practical painter's paint.

BEST PREPARED PAINT is made from the best paint materials it is possible to obtain. It is scientifically combined by heavy machinery into a mixture embodying the maximum of uniformity, ease of working, beauty, durability and economy, the essentials most necessary in paint.

While a great amount of BEST PREPARED PAINT is used by house owners and consumers annually, **it is well to employ a first-class painter when the best results are to be obtained as much depends upon the proper application of paint.**

The following rule shows the method of estimating the quantity of Best Prepared Paint needed:

EXAMPLE:

Front		20 feet
Rear		20 "
Side		40 "
Side		40 "
		120
Multiply by average height		20
Divide by	300	2400 (8 gallons
		2400

One gallon of Best Prepared Paint over a smooth or fair surface will cover 300 square feet two coats,

THE HEATH & MILLIGAN BEST PREPARED PAINT IS MADE IN SIXTY SHADES.
ALSO IN BLACK AND WHITE AND IS PACKED FOR SHIPMENT AS FOLLOWS:

Bbls.,	50 gallons.
Half-bbls.,	25 gallons,
5 gallon wooden buckets.	
1 gal. cans,	6 to a case.
½ gal. cans,	12 to a case.
¼ gal. cans,	24 to a case.

Put up in cans according to U. S. standard measure. viz: 231 cubic inches to the gallon.

NOTE:—Every exclusive agent for the H&M Paints has a copy of our book "PRACTICAL PAINTING." This book contains a vast amount of practical information which is the result of years of careful study, experimenting and application. In it will be found specific directions covering the proper uses of paints, stains, etc. over various surfaces.

Our exclusive agent will be glad to give you from this book any special information you may require not covered by the information on this color card.

The Heath & Milligan

LUNA ALUMINUM PAINT.

Purchase a small can of this article; apply a portion of it to your chandeliers, old lamps, moulding, or, for that matter, any article that will look well with an aluminum coating; then you will go to your dealer and purchase a larger package with which to redecorate many other things in and about your home.

It gives a soft, beautiful, silvery finish that is both pleasing and in keeping with any surroundings.

Flower pots, iron fences, lawn chairs, garden utensils and similar articles can all be made beautiful with a coat of The Heath & Milligan Luna Aluminum Paint.

It prevents rust.

H. & M. FLAT BLACK

is the article with which you can produce a beautiful wrought iron effect on any kind of a metallic surface. It is also adapted to wooden surfaces of all kinds, and the effect produced is that of black ebony.

Paint your bric-a-brac, small shelves, picture frames, chairs, beds, etc., with this article and produce a very novel effect.

Plan an entire bedroom in ebony. This is easily carried out. You can do it. H. & M. Flat Black, a brush and a little time are all that is required to accomplish this result.

H. & M. Flat Black and Luna Aluminum Paint make a beautiful combination.

362 And now at this time appear the complainants by Henry L. Stern, Esq., their solicitor, and Sigmund Zeisler, Esq., and W. S. Stambaugh, Esq., counsel, and also appears the defendant by John S. Watson, Esq., one of his solicitors, for the purpose of taking testimony herein on behalf of the defendant, and it is now stipulated that the taking of said testimony shall proceed before Mr. Robert H. Atkinson, who*ch* shall take down such testimony and transcribe the same until the arrival of Mrs. Jessie Conover, and the stenographer's notes shall be written out and the signing of the testimony by the several witnesses is waived.

St. Paul, Minn., Feb. 5, 1906.

——— ———.
——— ———.

363 E. F. LADD, a witness on behalf of the defendant is produced, and having been duly sworn to testify to the truth, the whole truth and nothing but the truth, testifies as follows:

Direct examination.

By Mr. WATSON:

Q. Professor Ladd, you reside at Fargo, North Dakota, do you?

A. I do.

Q. What official position, if any, do you hold in the Experiment Station of the North Dakota Agricultural College?

A. I am Professor of Chemistry in the North Dakota Agricultural College and Chemist of the Government Experiment Station at Fargo.

Q. Have you taken an education as a chemist?

A. I have.

Q. What studies have you pursued preparing yourself for the position which you occupy as chemist of that institution?

A. I took a course in the University of Maine and graduated with the degree of Bachelor of Science and was then in the latter part of my course, and a short time afterwards, assistant to Professor Balentine. I then went to Geneva, New York, in the State Experiment Station in order to study under Dr. Babcock, who was recognized as the leading agricultural chemist at the time. After having
364 been there for less than two months I was appointed as assistant chemist to Dr. Babcock and continued my studies with him for four years, until he went to Wisconsin to the University of Wisconsin, and then I became chief chemist of the Experiment Station of New York, which position I hel*f* until July, 1890, and then I accepted a position in North Dakota, taking up my work there the first of October of that same year, which position I have held since.

Q. What year did you graduate from the University of Maine?

A. 1884.

Q. Has your work continually, since your graduation at that time, been along the lines of chemistry?

A. It has.

Q. You are at the head of that department in the Agricultural College you say?

A. I am.

Q. What occasion have you had, in connection with your studies and your work since your graduation, to keep yourself familiar with and make yourself acquainted with the whole subject of chemistry?

A. Well, I have had occasion to continue my studies through the various works that have been written and the magazines, and kept posted in order that I might continue the investigations along in the Experimental Station and teaching of the studies in connection with the College. I have been carrying on investigations since
365 1884, continuously and studying and teaching.

Q. Have you had charge of all of the chemical work which has been connected with the pure food and the pure drug and pure formaldehyde enactments of the Legislature of North Dakota?

A. I have.

Q. Has your position as chemist and as Pure Food Commissioner of North Dakota made it necessary for you to acquaint yourself more or less with the branch of chemistry which we may designate as "the chemistry of paint"?

A. Yes sir, that was not an uncommon practice for samples to be submitted to the laboratory for examination in the years past, and during the past year it has been necessary to make a large number of investigations.

Q. That is since the enactment of the law under consideration in this case?

A. Yes sir.

Q. But prior to the enactment of that law what, if anything, fell to your care or under your supervision as to the inspection, examination, testing, and analysis of mixed paints and the ingredients of mixed paints?

A. Prior to the introduction of the bill into the Legislature, our work was to simply make an analysis of those paints that were generally submitted, sometimes owing to disputes and in other cases interested parties desired to know the composition of the paint.

366 Q. Well, has it been frequent or an infrequent thing for your department to be called on prior to the enactment of the law in question to analyze generally and give the results of your analysis of mixed paints?

A. Well, it would probably average six or eight samples a year, in our investigations.

Q. As a result of your study of chemistry and of your work in the laboratory, as you have now detailed it, have you familiarized yourself generally with the subject of the chemistry of paints, with the quality and general value of the different pigments and ingredients used in the preparation of mixed paints?

A. Yes sir, to a considerable extent. It has been necessary to take up in an incidental way, the study and investigation of the work during the past years and as far as the length of time will permit or has permitted, we have carried the investigation through.

Q. Aside from your tests and analysis of these mixed paints what,

if any, special or particular studies have you pursued in the matter of reading, studying and posting yourself up upon the conclusions of writers of recognized authority upon the subject?

A. I have tried to acquaint myself with all of the leading authorities.

Q. I will be very glad to have you mention the names of the scientific writer- upon this subject whose printed works you
367 have consulted and with whose writings and instructions you are more or less familiar in this investigation?

A. Well, we have examined carefully, Sabin, Hurst, Church, Ellis, Terry and the work by Hooker,—Smith's and others that did not bear so fully on the subject, that dealt more generally with the subject, including the works on industrial chemistry and especially Thorp's Technology.

Q. Are these writers whom you have mentioned,—have they a standing in the scientific world as authorities upon the subjects touching which they have written?

A. They have.

Q. You have purchased and have in the library of the Chemical Department of the Agricultural College copies of their works, have you?

A. Yes sir.

Q. On those subjects?

A. Yes sir, and many others, that are not as full on the subject.

Q. And many others you say?

A. Yes sir.

Q. Well, have you studied all that you have been able to find written upon this subject, and have the conclusions of these various writers, recognized in the scientific world, had proper consideration at your hands and the conclusions which you have reached upon this subject?

A. Yes sir.

368 Q. Referring now to the statutory pigments, I will ask you to describe generally what are the valuable qualities of the carbonate of lead as a pigment, in the preparation of paints?

A. It is recognized by all the authorities with whom I have become conversant and in our own studies as the standard of comparison for all other pigments, white pigments. It possesses properties which make it a valuable pigment, in that it combines readily with most of the other pigments used, that it has got obscuring or hidden power, good covering power; that it combines one of its constituents with oil to form lead linoleatem which make- an elastic and tough body, that gives to the paint much of its valuable property of protecting——

Mr. ZIESLER: I object to so much of the answer, and move that so much of the answer be stricken out as purports to state what is recognized by writers on the subject, that part of the testimony being purepy hearsay.

Mr. WATSON:

Q. Do I understand that carbonate of lead possesses this quality of elasticity in a greater degree than any other pigment used in the preparation of paint?

A. We probably should call the combination with the linseed oil as that.

Q. That is what I meant.

A. Yes sir.

369 Q. And what is the effect obtained in the durability or life of paint by its possession of this quality of elasticity?

A. The fact that it is elastic and tough prevents its cracking and breaking, which would be the case were it not tough and elastic.

Q. And lacking elasticity, what is the natural tendency of the body of the coat of the paint, the body or coat of paint as to the water and gas in the atmosphere getting underneath it and thereby disintegrating it?

A. If the paint cracks and the water gets under this it helps to break it away from the wood itself.

Q. Carbonate of lead you say is the oldest of all the pigments used in the preparation of paints?

A. Yes sir; or at least among the oldest of the pigments, all the pigments.

Q. It has been in use at least since the beginning of the Christian Era?

A. Yes, it was in use by the Romans.

Q. Can you tell us approximately the amount of carbonate of lead which is now annually produced and consumed in the United States?

Mr. ZEISLER: Object to the witness stating this unless he knows from his own knowledge.

(Whereupon the question was here read by the reporter.)

A. At the present time?

Mr. ZIESLER: And furthermore on the ground that the
370 question is immaterial and irrelevant so far as it is not limited to the consumption of carbonate of lead in paints.

Mr. WATSON:

Q. You may answer.

A. That is, according to the best information that I have been able to gather in 1905, the estimates are something over two hundred thousand (200,000) tons produced and used.

Q. Can you state what the production was fifteen years ago?

A. According to the figures given in the United States Cens-es it was about sixty-five thousand (65,000) tons.

Mr. ZEISLER: Objected to and move that the answer by stricken out on the ground it is an attempt of the witness to state what is contained in the documents easily available.

Mr. WATSON:

Q. Will you tell us about how the production and consumption was ten years ago?

A. In 1890, according to the United States——

Q. That would be fifteen years ago. You have just testified as to fifteen years ago.

A. I have not available figures between 1890 and 1900.

Q. Do you know what the consumption,—the production and consumption were in 1900?

A. 1900 it was given as about one hundred ten thousand (110,000) tons.

371 Q. In your opinion what is the advantage of a pigment which unites and forms a chemical union with linseed oil as compared with an inert pigment which does not form such an union, when the same are used in the preparation of a mixed paint?

A. I believe from my studies and examination that the union formed between the lead hydrate or the hydrated part of the lead carbonate and linseed oil adds great durability and valuable lasting quality to the paint, that is not furnished by inert pigments.

Q. Will you mention any other valuable quality possessed by carbonate of lead as an ingredient of mixed paint which distinguished it from that of the other pigments, either those mentioned in class A or class B?

A. Its greater hiding or obscuring power when combined with oil in the proportion for working consistency.

Q. I will ask you whar are the valuable qualities of oxide of zinc as a pigment in the preparation of mixed paint?

A. In forming a harder body tends to give firmness and hardness to the lead if not used in too large proportion.

Q. Does a mixed paint in which both carbonate of lead and oxide of zinc are used as a basis possess superior qualities to one in which either of those pigments would be used alone and without the other?

A. I believe it does.

Q. Oxide of zinc as a pigment is produced in different parts of the United States, is it?

A. It is.

372 Q. Where do you find this oxide of zinc produced in its purest form?

A. In New Jersey.

Q. Is it produced alsi in Wisconsin?

A. It is.

Q. What name is usually given to oxide of zinc which comes from Wisconsin?

A. It is often spoken of as mineral point zinc I believe.

Q. And that is the pigment which is mentioned in class A as the zinc made from western ores?

A. Yes sir, so I understand. Yes sir.

Q. Passing now to the substituted pigments mentioned in class A, I will ask you in regard to sublimed white lead. In the first

place, Professor, is there distinction to be drawn between sublimed white lead and sulphate of lead?

A. There is. Although it is not easy to distinguish chemically between the paints, between the sublimed white lead and the lead sulphate.

Q. Sublimed white lead is a name, as I understand it, given to the production of a single large factory or reduction works in Missouri?

A. Yes sir.

Q. What is the name of that factory?

A. It is called Picher's Sublimed White Lead. And Joplin, I think, is the location.

373 Q. Then am I correct in understanding that sublimed white lead, or the product designated by that name, is produced principally from Missouri ores?

A. That is as I understand it in this suit.

Q. And it is by a process of sublimation?

A. It is said to be.

Q. Now, in the purification of ores produced in Colorado and other western States, you often find a certain percentage of the sulphate of lead in connection with the zinc ore do you?

A. Yes sir.

Q. What percentage of sulphate of lead would have to be present in the lead thus produced from Western ores, without destroying its commercial purity?

A. It would be difficult to say, but it would seem that that which was incidental to the preparation of the highest grades of the product might be classed as commercial impurity the same as in the case of sublimed lead if there was five (5) per cent. of zinc oxide that was recognized as incidental to the progress of manufacturing, and in the same way a small percentage two (2), three (3) or four (4) or possibly five (5) per cent. would be recognized possibly as commercial impurity of the sulphate in the zinc, among that class of ores.

Q. In the production, however, of the New Jersey oxide of zinc you would not find present anything more than a mere trace of the sulphate of lead?

A. Not in the analysis with which I am familiar. It is usually absent from the New Jersey oxide of zinc.

374 Q. Is the entire absence, then, do I understand, of the sulphate of lead in the production of the New Jersey zinc one of things which makes it a high ingredient, or higher value, and of a better quality than the zinc which is produced from the western ores?

A. Yes, sir.

Q. And is that—do I understand you, one of the grounds for your classifying New Jersey zinc as a better article, possessing better qualities for use in the preparation of mixed paints than the zinc obtained from western ore?

A. Yes, sir.

Q. You may tell us in regard to sublimed white lead and its properties as an ingredient in the preparation of mixed paints?

A. Well, in the first place the product has not been found or reported to be of entirely uniform composition. It varies, according to the analysis, somewhat in its composition, in fact to a considerable extent.

Q. You were present at the taking of depositions in Chicago, were you?

A. Yes, sir.

Q. And you heard the testimony which was given there in relation to Hurst's analysis of different samples of sublimed white lead?

A. I did.

Q. And the conclusions which he stated as to its lacking uniformity in the constituents which composed it?

A. I did.

375 Q. I will ask you whether the other authorities in the scientific world of paint agrees with the conclusions of Hurst on this subject of the lack of uniformity of constituents in sublimed white lead?

Mr. ZIESLER: Objected to as calling for hearsay evidence, and I also move to strike out the previous answer of the witness wherein he says that sublimed lead is reported to be variable.

(Whereupon the question was here read by the reporter.)

A. There is not a very great deal of difference that I can find, but I have the authorities dealing with this subject, but as far as I can gather it has not been recommended, they agreeing in substance with Hurst.

Mr. WATSON:

Q. I suppose the ores from which the sublimed white lead is produced are drawn from a much wider territory than the ores in New Jersey from which the oxide of zinc is produced. Is that true?

A. I could not say.

Q. You mentioned in your bulletin, which is in evidence in this case, the qualities of sublimed white lead in the matter of body, covering power and durability, did you?

A. Yes, sir.

Q. Will you state, Professor Ladd, what objections there are to the use of sublimed white lead as an ingredient in the preparation of mixed paints, if there are any objections?

376 A. In the first place the lack of uniformity in composition. In the second place the tendency to harden in the can. And in the third place the difficulty of brushing out or spreading, especially in cold weather are recognized objections to the use of sublimed white lead.

Q. You heard the testimony at Chicago to the effect that the total production in consumption of sublimed white lead in the United States at the present time is from five to seven thousand tons per year?

A. I did.

Q. Do you agree with that conclusion?
A. According to the best information I can gather, yes, sir.
Q. I will ask you if you have consulted the price list of trade journals of New York and Philadelphia as to the present comparative prices of sublimed white lead and carbonate of lead?
A. Yes, sir.
Q. What authorites have you consulted?

Mr. ZEISLER: Objected to as immaterial and irrelevant.

A. The Oil Paint Drug Journal of Philadelphia, giving us the cash quotations; the New York Journal that I am familiar with does not quote it.

Mr. WATSON:

Q. That is to say you do not find sublimed white lead quoted in the trade journals of New York?
A. Yes, sir.

Q. Is that the leading trade journal of New York that you
377 have consulted?

A. It is the leading one with which I am familiar, at least.
Q. Does it give a large number of quotations or any quotations upon a large number of pigments and ingredients used in the preparation of paints?
A. It does.
Q. And you do not find contained in it any quotation whatever of sublimed white lead for the New York market?
A. Not for the past few months at least.
Q. What is the name of this New York Trade Journal?
A. The Oil, Paint and Drug Reporter.
Q. That is for the issue of January, 1906?
A. Yes, sir.
Q. The name of the Philadelphia publication to which you alluded is——
A. Drugs, Oils and Paints.
Q. And this issue is for December, 1905?
A. Yes, sir.
Q. In the Philadelphia market, both for the issue of December, 1905, and for the two or three months prior to that time, what do you find to be the price of sublimed white lead as compared with the price of carbonate of lead?

Mr. ZEISLER: Objected to as incompetent, irrelevant and immaterial.

A. Averaging about one cent per pound less than the carbonate.

Mr. WATSON:

Q. Professor Ladd, passing now to the standard zinc lead
378 white, commonly called zinc lead, what will you say about that article as a proper or useful ingredient in the preparation of mixed paint?
A. In the first place it is very variable in composition, not at all

uniform. It may contain as high as fifty per cent. of lead sulphate and fifty per cent. of zinc oxide, or very slight variations from these. It is not uniform in color. It has been reported as not forming a satisfactory produce with the oil.

Mr. ZEISLER: So mus*t* of the answer as follows the words 'it has been reported' is objected to and I move that the testimony be stricken out as hearsay evidence.

Mr. WATSON:

Q. Why is the lack of uniformity in the constituents composing it an objection to its usefulness, its valuable use as a pigment in the preparation of mixed paint?

A. The manufacturer could not depend upon two lots as producing the same effect, the same result in the first place. In the second place the action of the sulphate is recognized as being objectionable in the paint by some of the authorities at least.

Mr. ZEISLER: That part of the answer which refers to what is recognized by others and is reported to be a conclusion of others is objected to on the ground of its being hearsay, and I move
379 that the testimony be stricken out.

Mr. STERN:

Q. Provided it carried sulphate. Do you mean sulphate of lead or zinc?

A. Sulphate of lead.

Mr. WATSON:

Q. You mentioned Mr. Hooker's works as one that you have consulted on the subject of paints?

A. I did.

Q. What is Mr. Hooker's full name?

A. Albert H.

Q. That is the Mr. Hooker who is present here when the testimony is being taken?

A. Yes, sir.

Q. And he is the Chief Chemist for the Heath & Milligan Manufacturing Company, one of the complainants herein?

A. Yes, sir.

Q. Referring to Mr. Hooker's printed book called "A Treatise on White Leads and Various Processes of making Linseed Oil, etc.," and to the following language contained on page 99 of said book as follows:

"The New Jersey ore is very uniform in its composition and free from lead. The problem- confronting the Western manufacturer are more complex, owing to the wide range of territory drawn upon and the varied character of the ore which he is called upon to treat, hence western zinc grades from nearly pure oxide with a small percentage only of lead sulphate to a leaded zinc containing a high percentage of lead sulphate. Even a small amount of lead will cause serious trouble to the maker of white rubber, a special selection being

required for that particular grade of work. As a painter's pigment, however, the presence of a little lead is of no consequence." I will ask you if you agree with Mr Hooker's conclusions that the presence of a little lead as a painter's pigment is of no consequence?

A. That probably does not materially effect the results secured.

380 Q. You say that the presence of lead sulphate in the zinc made from western ore is variable in its percentages?

A. Yes, sir, and also the zinc sulphate as well.

Q. Referring, however, to the first, simply to the presence of the lead sulphate, if it were there in any considerable percentage, what effect would it have upon the value of the paint in which it was used?

A. It tends to reduce the efficiency of the paint and is not found, to any great extent, in our analyses in the highest grades of paints that are on the market.

Q. Does that, then, constitute, in your opinion, one of the objections to the use of this standard zinc lead white and zinc made from western ores?

A. That is one of the objections yes sir.

Q. Mr. Hooker, in his work, at the bottom of page 99, also used this language:

"Other factors, such as moisture, granulation due to moisture and zinc sulphate, zinc sulphate, condensed sulphurous gas, etc., are of much greater moment in considering the true paint value of zinc oxide."

And in referring to the analysis found on the top of page 100 of the same work, and especially the analysis of sample number 4, Mr. Hooker says:

381 "Number 4, although a good color and body, could only be used under favorable circumstances, owing to the extreme amount of sulphur it contains, both as occluded sulphur dioxide and as zinc sulphate, either of which in excess being detrimental to many paint compositions."

And sample 4, showing the presence of 43 per cent. of sulphur dioxide. Do you agree with that conclusion of Mr. Hooker?

A. I do.

Q. As compared with the oxide of zinc as produced in New Jersey, what will you say generally as to the zincs from western ores in the matter of the latter containing a greater quantity of sulphur dioxide?

A. They would lack in uniformity and would not be as satisfactory for paint making.

Q. You would assign that, then, as one of the reasons why pure oxide of zinc is more satisfactory and makes better quality of paint?

A. That is one of the reasons, yes sir.

Q. You are acquainted with the Opaque white pigment which has been referred to as lithopone?

A. To some extent from the analysis, yes sir.

Q. In your opinion, what are the valuable qualities of lithopone when used as an ingredient in the preparation of paint and what are the objections, if any, to its use for that purpose?

A. Simply its cheapness would be the only thing I should
382 say for recommending it in the preparation of mixed paints and its objections are lack of uniformity and color and composition and the fact that it can not be used in connection with lead or can not be used as a paint satisfactorily where lead paints have been previously employed on buildings.

Q. What is the tendency of paint in which lithopone is used as a basis to become streaked or to run down, when applied, for instance to the side of a house?

A. Why, it becomes colored and darker and streaky in appearance from its reaction with the lead, if it were present in the previous coats of paint.

Q. In composition with linseed oil would lithophone, when used as a basis, form a chemical union, or is it an inert material?

A. I could not say from actual examination there. I would not expect it to form the same kind of a combination as is formed with white lead.

Q. Is there more than one grade or quality of lithopone upon the market?

A. Yes sir, there are a number of them.

Q. Do they vary in quality and in price?

A. They do.

Q. Is there a small variation in the quality and the price or a considerable one?

A. There is a wide variation.

Q. Can you tell us about how long sublimed white lead has been produced as a commercial product in the United States?

A. At least twenty years.

383 Q. And not before that time as you understand it?

A. It may have been to some extent, but as a commercial product I should say not more than twenty years.

Q. And for what length of time has standard zinc white lead commonly called zinc lead been an article of commercial product and consumed in the United States?

A. For a much less time that that.

Q. And for how long has zinc made from the western ores carrying sulphate of lead and oxide of zinc in varied proportions, how long has that been produced as an article of commerce in the United States?

A. I am not sure but I think about the same length of time. I can not say for certain.

Q. And lithopone?

A. Lithopone perhaps fully as long from the first, but it has only recently come in again as a product, for the general use.

Q. You are acquainted with barytes or sulphate of barium?

A. I am.

Q. What are its uses in the chemistry of mixed paints?

A. It is used in mixed paints chiefly as an ingredient or a reducer of the cost of paints.

Q. What is the commercial value of barytes on the market?

A. It is less than one cent per pound, the commercial price.

Q. Does it form when used with linseed oil, a chemical
384 union, or is it what you would call an inert material?

A. It is an inert material.

Q. What are the objections to its use as a substitute pigment in the preparation of mixed paints, if there are any objections?

A. In the first place it is without hiding power in oils. In the second place it is gritty. Moreover, it is gritty and tends to run and cut in the paint. It is used chiefly——

Mr. ZEISLER: Cut what?

A. Cut in the paint as it runs, when it is put on the side of a building. That is, it is heavy like sand and runs down and does not combine with the oil and produces the streaky running appearance, gritty.

Mr. WATSON:

Q. Can you think of any other objections?

A. Those are the chief ones.

Q. Those are the principal ones?

A. The principal ones, yes sir.

Q. What are the useful qualities, or on the other hand, the objections to the use of silica or silicate or magnesia as an ingredient in the preparation of mixed paints?

A. Like the barytes it has no obscuring power with the oil itself. It does not form a true pigment with oils and is principally reducing the cost of the paint itself.

Q. Does it, in your opinion, add any useful quality to the hiding power, the life or the durability of the paint in which it is
385 used as an ingredient?

A. No sir.

Q. Does what you have now testified in relation to silica apply also to silicate of magnesia?

A. It does.

Q. What are the valuable uses of calcium carbonate and also what are the objections to it, if any, for use as an ingredient in the preparation of mixed paints?

A. Calcium carbonate is sometimes used in a small amount to neutralize the acidity in the oil, principally as a cheapening ingredient in the production of the paint. One of its objections, that of alkali in its nature, tends to destroy the oil and rot it.

Q. Would that effect the durability of the paint?

A. It would.

Q. In what way?

A. By destroying its life so that the paint would not last as long in the building, as a protection.

Q. Is this an inert material or does it form a chemical union with the linseed oil?

A. It is, to a certain extent it is inert, and on the other hand it *it* is alkali it acts upon the linseed oil decomposing it and destroying the life of it, and if there is acids present, it acts on the acid portion to neutralize the acidity this being the only advantage which it seems to offer.

Q. Calcium carbonate includes what articles? I mean give the names of the articles which are commonly based upon that name and which are used in the preparation of mixed paints?

386 A. They might be ground limestone or marble or chalk, which is often called English cliff stone, and whiting.

Q. Does what you have said now in relation to calcium carbonate apply to hydrated sulphate of lime?

A. No, this is calcium sulphate and is a different product and is not nearly——

Q. Just describe the hydrated sulphate of lime, its valuable uses, in the preparation of mixed paints, and the objections to it, if there be any?

A. I do not know that it has any valuable properties, more than to cheapen the paint. It has no hiding power. It reduces the cost of the production of the paint, without adding any additional usefulness to the statutory pigments themselves.

Q. I will ask you what the fact is, at the present time, in the manufacture of mixed paints, as they are found upon the markets in North Dakota as to their adulteration by the use of one or more of the ingredients mentioned in class B?

Mr. ZEISLER: Objected to until the terms 'adulteration' is defined so that we may know the sense in which the witness is using the word.

Mr. WATSON:

Q. Just define it?

A. Paints may be divided into two classes as sold in the State, those which are free from members of class B and those

387 which contain members of class B. There are some manufacturers whose paints are entirely free from any of these constituents, while there are other manufactured paints offered for sale in the State that contain from a small amount to a very large amount of one or more of these class B constituents or pigments, mineral constituents.

Q. What do you mean by the use of the word 'adulteration' or the use of 'adulterants' in the preparation of mixed paints?

A. I should say an adulterant was any portion which does not properly belong in a paint to produce a high grade of paint unless it was named in the label or upon the paint itself, or the use of any one of the other pigments in paints which were generally sold and recognized as being made from the lead carbonate and zinc oxide.

Q. Would you, however, stigmatize as adulterated the use of pigments which contained so much percentage of for instance sulphate of lead which was merely incidental to the production of the oxide of zinc itself?

A. The presence of commercial impurities would not make a paint an adulterated product.

Q. Then, as I understand you, it would be the use of these less valuable pigments in excess of what would be incidental to the manufacture?

388 A. Of a good commercial product.

Q. Of a good commercial product?

A. Yes sir.

Q. I will ask you whether the pigments, barytes, silica and calcium carbonate are the ingredients which at the present time are the most largely used in the adulteration of mixed paints?

A. Yes sir, especially the calcium carbonate in the mixed paints offered for sale and examined in North Dakota.

Q. You agree in that particular, then, with the testimony of Mr. Toch or Mr. Lane, as to the substances which are most generally used as adulterants in the preparation of mixed paints?

Mr. ZEISLER: Objected to on the ground that the testimony of Mr. Lane and Mr. Toch will speak for itself and the testimony of this witness on that subject will speak for itself.

A. Yes sir, these are the most common adulterants.

Mr. WATSON:

Q. Referring now to your bulletin number 67, attached to your affidavit on file in this case, I will ask you whether, when that bulletin was prepared and put into print your department had fully completed its chemical analysis of all of the samples of mixed plaints therein referred to?

A. The analysis was not fully completed.

Q. What was the occasion of your publishing this bulletin
389 before your analyses of those samples had been fully completed?

A. It was announced that the courts were being——

Mr. ZEISLER: Objected to as immaterial and irrelevant.

A. It was announced that the courts were to be asked for a restraining order to prevent our interfering with the enforcement of the law or publishing anything which would in any way jeopardize the interests of the paint manufacturers until the question of the constitutionality of the law had been passed upon by the courts.

Mr. WATSON:

Q. In a number of the analyses in this bulletin in describing the carbonate of lead and the percentage that it contained, you used the expression "Lead calculated as white lead." Why did you use that expression?

A. In the instance where this statement was used the analysis was not at the time fully completed. We had not determined the carbon dioxide to check up with the amount of lead nor had we completed the determination for the lead sulphate. Therefore, that the manufacturers might have the benefit of the statement, and the lead being in the form of lead carbonate we calculated the amount of lead in the form of lead carbonate or white lead and so expressed it in those cases.

Q. Since the getting out of this bulletin have you continued your analyses of some or all of these samples so as to determine

whether the ingredient described as above was carbonate of
390 lead or contained other products of lead?

A. We have, in those points which are generally sold in the State.

Q. Well, what paints are generally sold in the States?

Mr. ZEISLER: Samples of those which you have analyzed?

A. The majority of the cases with the exception of those of Montgomery, Ward & Company and Sears, Roebuck & Company, and the paint of a few of those that are not generally sold but shipped into the State.

Mr. WATSON:

Q. Referring now to sample number 7, in your bulletin page 590, in which you give 57.72 per cent. as being the proportion of lead calculated as white lead, have you further analyzed that ingredient since this bulletin was gotten out?

A. We have.

Q. And what do you now find is the fact as to that ingredient?

A. We found no lead sulphate in the samples.

Q. Any sublimed—do you find any sublimed white lead in it?

A. No sir.

Q. Then how would you now give the result of that analysis as far as the ingredient of the lead is concerned?

A. It would be white lead or lead carbonate.

Q. Referring to your analysis of sample 36, shown upon page 591, and the top of page 592, what do you find as the result of your further analysis in the matter of the lead carbonate
391 contained therein?

A. We found that there was no sublimed white lead or lead sulphate either in the white or the greys which we have thus far examined.

Q. Referring to samples 38, in which you give 18.84 per cent. of lead calculated as white lead, what does your further analysis disclose as to the ingredients of lead?

A. That neither in the white or the greys, as far as examined, did we find either sublimed white lead or lead sulphate.

Q. Referring to samples number 39, Patton's Sun Proof Paint, at the top of page 593 of your bulletin, what do your further tests show as to the ingredient of carbonate of lead contained in that sample?

A. It shows that in the sample further examined that 5.26 per cent. was in the form of lead sulphate and the balance as lead carbonate.

Q. Can you tell whether that 5.26 per cent. is sublimed lead or is sulphate lead?

A. I could not say but from the amount present, I should expect it to come as sulphate of lead so called from the zinc oxide used in the manufacture of the paint.

Q. Do you know of any chemical test to which you could have subjected that in-redient of the paint in order to determine with

certainty whether it was sublimed white lead or was sul-
392 phate of lead?

A. With my present knowledge I could not.

Q. Well, have you made any effort to find what chemical test, if any there is, by which you could determine certainly that fact?

A. We have not been able to find it.

Q. Well, I understand your opinion is that the sulphate of lead there at present was incidental to the manufacture?

A. Yes sir.

Q. And what did it indicate as to the ore from which the product was derived?

A. That it was the western ores.

Q. And now the New Jersey zinc?

A. And not the New Jersey.

Q. How is that?

A. And not the New Jersey would be the conclusion.

Q. Referring to sample number 40, at the bottom of page 593, and the top of the following page, what did your further investigation disclose in relation to the presence of lead sulphate?

A. *Land* sulphate was as given as true in the analysis and the further examination of the greys showed a trifle over 2.43 per cent. of lead sulphate.

Q. Did it disclose any sublimed lead?

A. No sir.

Q. That is, you would draw the same inference that the sulphate of lead there present was incidental to the production there?

A. Yes sir, a combination of this kind.

393 Q. Referring to sample 41 on page 594 and 595, what was the result of your further tests as to the ingredient given as lead calculated as white lead?

A. We found no lead sulphate or sublimed white lead.

Q. So if you were making up this sample, number 41, at this time, in the description of the pigments, how would you describe the lead?

A. As white lead or lead carbonate.

Q. In other words, you would not find it necessary to employ the additional phrase 'calculated as white lead'?

A. We should not.

Q. Referring to sample number 42, page 595, of the bulletin, what did your further tests show in the matter of the pigments of lead in that sample?

A. That it contains lead in the form of lead sulphate and that in the sample of grey further examined we found, as lead sulphate, 25.85 per cent. practically of pure lead sulphate and not carbonate.

Q. Could you tell in this sample whether this lead sulphate was a lead zinc or was sublimed white lead?

A. I could not say. It might be either, as far as the means that I have of determining between the two chemicals in combination.

Q. In the production of lead zinc from western ores would you find present or is the variation such that *it* some instances you
394 would find present as large a proportion of sulphate of lead as is found in those samples?

A. Yes sir, even more.

Q. And it was as to the presence of sulphate of lead as an ingredient in mixed paints, in the preparation of mixed paints that Mr. Hooker said that very little might be used?

A. Yes sir.

Q. Well, what would you say as to the effect of the use of 25.85 per cent. of lead sulphate as a pigment in the preparation of a mixed paint, how would it affect the quality of the paint?

A. I would not expect it to produce a high grade paint and especially so in combination with the other constituents in this paint.

Q. As given in this sample number 427?

A. Yes sir.

Q. Referring to sample number 43, found on page 596, of the bulletin, what did your further analysis show as to the pigment of lead, contained therein?

A. Of the white paint we found approximately 12 per cent. of lead sulphate. In the grey 11 per cent. of lead sulphate.

Q. Could you tell from your test whether that was sulphate of lead produced by the use of zinc from western ores or whether it was sublimed lead?

A. I could not.

395 Q. It was one or the other?

A. Yes sir, one or the other. Yes sir.

Q. Referring to sample number 57, found on page 598, what did your further tests show as to the presence of the sublimed white lead in that sample?

A. The sample, as quoted there, contained lead sulphate as found by us 4.29 per cent. The sample of grey has not been completed, but there is no white lead.

Q. Your conclusion would be the same as to your inability to determine whether this lead sulphate came in the use of zinc from western ores or was sublimed white lead?

A. If it was a low amount I should think it to be a commercial impurity of some of the constituents used. It might be either.

Q. Referring to your further investigation as to samples 50 and 61 on page 600, what did your further investigations disclose as to the lead used as a pigment in the preparation of that paint?

A. Neither in the whites nor in the greys did we find any lead sulphate.

Q. Is the same thing true in sample number 63 found at the top of page 602?

A. Yes sir, that is, there is lead sulphate found there, as quoted 3.89 per cent. of the material is lead sulphate.

396 Q. What is true as to sample number 71, found on page 603?

A. We found no lead sulphate either in the whites or the greys.

Q. What percentage of the mixed paints used in North Dakota in your opinion are made up of what you have called the whites and the greys, and which, generally speaking, are fairly represented by the samples touching which you have testified?

Mr. ZEISLER: Objected to on the ground that the witness has not shown himself competent to answer that question.

A. Well, from the inspection of painted buildings in the various towns I should say that not less than seventy per cent. of the paint used was either white or of the greys.

Mr. WATSON:

Q. In the preparation of mixed paints, is there such a thing known in the trade as the adulteration thereof by the use of carbonate of lead and oxide of zinc or is there such a thing known as the employment of carbonate of lead or oxide of zinc or either of them as adulterants in the preparation of mixed paints?

A. I have not found them under the paints examined in North Dakota, but I would so consider.

Q. Taking the definition which you have already given of the adulteration of mixed paints, what are the ingredients which are most commonly used and which lend themselves the most readily
397 to such adulterants?

A. They are the members of class B most largely used, and only in one or possibly two or three instances have I found members of class A as an adulterant in paints thus far examined.

Q. You have not then, I take it, found any very extensive use of the class A pigment in the samples which you have examined?

A. No sir, only so far as the western zinc which varies in its composition and therefore it contains sometimes what might have been more than the commercial impurity.

Q. You refer to the western zincs containing some percentage of lead sulphate?

A. Yes sir.

Q. But outside of the zinc made from western ores described as the substitute pigment in class A, you say that you have not found very many other of the pigments mentioned in class A, present in the samples which you have examined?

A. Only in the instance that I noted above, one case there, and in two others it may or may not have been, according to my best judgment.

Q. Then these pigments described in class A outside of zinc from western ores, do not, as I understand you, appear in any de-
398 grees of frequency in the mixed paints sold in North Dakota?

A. No sir.

Q. And the ingredients which you would find more frequently are those described in class B?

A. Yes sir.

Cross-examination.

By Mr. ZEISLER:

Q. You told us, Professor Ladd, that you had provided yourself with a number of books on chemistry and technology of paint, and have mentioned the names of their authors. May I ask you when you gathered this little library together?

A. Some we have had for years. Others have been gathered during the past year, up to the present time, when we are still gathering them.

Q. Which books had you had on your shelves for some years past?

A. Well, we had the general Encyclopedia of Chemistry and Dictionary, and Thompson's works, Stillmann and those that deal to some extent, but most of the paint works dealing exclusively with paints have been gathered during 1905, including Hurst and Sabin.

Q. Those general works on chemistry which inadvertantly treat of paint chemistry and which you had on your shelves prior to 1905, were in your library for other purposes than the study, the paint chemistry, were they not?

399 A. Yes, they related more, more fully with other subjects, that is there were works on industrial chemistry, including paints and paintings at the same time.

Q. In other words, do I understand, Professor Ladd, that the gathering of this library on paint chemistry and technology and your study of the contents of those books really occupied you for the first time since this law was passed by the Legislature of North Dakota. Is that correct?

A. As a special study, with the exception of becoming familiar enough so as to be able to give the methods of analysis to our students and for the testing of special samples that came in, but the special study began in 1905 or thereabouts.

Q. You have not made a study prior to 1905 of the methods of manufacture and the peculiarities and properties of the various pigments prior to 1905, have you?

A. Only in a general way.

Q. You would not have undertaken to take the stand as an expert on the properties of pigments prior to 1905, would you?

A. No sir.

Q. In other words, what knowledge you had on the subject was merely incidental and only that knowledge which from your general study of chemistry you had learned and which became nec-

400 essary for the purpose of making analysis of the samples which from time to time came into your laboratory for examination?

A. And to acquaint myself enough with it so as to be able to give some little instruction in the paint matter, but more in that particular line.

Q. Well, to come down to a concrete illustration, prior to 1905 you would not have undertaken to express an opinion as to the relative merit of New Jersey zinc and zinc from western ores?

A. Well, I think I had a sufficiently well informed opinion that I should have made a distinction in my own mind if I was going to buy it, if I were going to, but not as an expert, no sir.

Q. Do you mean to say that prior to 1905 you did know of the characteristic distinction between New Jersey zinc and zinc from western ores?

A. I knew that New Jersey zinc was the purest zinc and incidently is the purest zinc of American zincs.

Q. And could you have told just what the characteristic difference was?

A. I do not think I could without looking the matter up and familiarizing myself.

Q. Well, then, explain in a general way just the degree of preparation that you had made for expressing opinions on these technical questions prior to 1905?

A. On this particular question, yes sir.

401 Q. Prior to 1905 could you, without looking it up in some reference work, have told the characteristic composition of sublimed white lead?

A. No sir, I don't think I could have.

Q. Had you, prior to 1905, ever examined or taken a sufficient interest to inform yourself on the properties and composition of the commercial product known as zinc lead white?

A. I had not, no sir.

Q. Prior to 1905 had you informed yourself of the various processes of making lithopone and the various compositions of what passes generally under that name?

A. Only so far as I had read from some of the articles in technical journals.

Q. You had read these articles casually?

A. Yes sir.

Q. And not for the purpose of informing yourself specially on the subject?

A. No sir, to acquaint myself to a certain extent.

Q. Well, the same thing is true in regard to these other pigments of class- A and B, both?

A. Well, not of class B. My experience with those and the constituent in them is very different knowledge than I had of class A.

Q. The fact then, as I understand it, is that your studies of this subject began when it became a matter of acute importance by
402 reason of the passage of the North Dakota paint law. Is that correct?

A. This is practically true of class A and of the subject as technical subject, yes sir.

Q. How soon after the law was passed did you begin to collect this library and make this study?

A. Well, I began to make preparation for it probably about some time in March or the first of April, but no analytical work of any importance more than preliminary work was undertaken until about June.

Q. You didn't know, did you, Professor, that the Legislature contemplated passing this law until you accidentally found it out when you were at the seat of the Legislature, one day?

Mr. WATSON: Objected to as irrelevant and immaterial.

A. That was the first knowledge that I had that the bill was introduced, yes sir.

Mr. ZEISLER:

Q. Were you consulted by any member of the Legislature as to what ingredients should be specified in the Act?

Mr. WATSON: Objected to as not proper cross examination and as irrelevant and immaterial.

A. At the time that I was at Bismarck, yes sir.

Mr. ZEISLER:

Q. After the bill had been introduced?

403 A. Yes sir.

Q. And after the ingredients had already been specified and the bill submitted to the Legislature?

A. Yes sir.

Q. The ingredients that were specified in the bill were not changed as the result of any conversation that you had with members of the Legislature, were they?

Mr. WATSON: Objected to for the same reason.

A. The ingredients were not changed. But I suggested that where other ingredients were employed that the percentage of the same should be shown.

Mr. ZEISLER:

Q. Now, you began to make analysis of paints for the purpose of the enforcement of this law and in connection with it, in June 1905. Is that correct?

A. We began making examination of paint ingredients earlier than that, but of the mixed paints themselves I think it was sometime in May when we began to gather samples and make examinations in June.

Q. Now, during this year you continued to perform your duties as professor at the college, did you?

A. Yes sir, I did; yes sir.

Q. And during the same time you continued to act as Pure Food Commissioner for the State of North Dakota, did you not?

A. Yes sir, I did; I had assistants of course.

Q. And during that same time you edited a newspaper?

A. In part.

404 Q. Wrote articles for it?

A. Yes sir, to a certain extent.

Q. You published quite a number of bulletins during the year on other subjects than paint, did you not?

A. I published one bulletin on other subjects than paint and a compilation of the law of the State dealing with paints a compilation of the laws of the State which came under our jurisdiction.

Q. Have you been able to devote much time to perfecting your knowledge on the subject since the beginning of this year?

A. Since the beginning of 1906?

Q. Yes.

A. I have, yes sir.

Q. Your analysis, as I understand, were confined to white mixed paints during the year 1905, were they not?

A. No sir, not wholly. In the main it was confined to the white paints but a few others were examined and in November we began gathering the greys. Up to the present time we have been examining the greys, principally.

Q. Now, your particular study of the subject, so far as you have made that study, was not continued during the year 1906, was it?

A. During 1906?

Q. Yes?

A. I should say it had been, yes sir.

Q. What additional study did you make during 1906?

A. I should say that we have been, under my charge, con-
405 tinuing the examination of the greys and studying the oils and particularly the turpentine and the dryers that are used in connection with the manufacture of paints.

Q. I was speaking of the theoretical study of the subject of white pigments?

A. Well, I have been looking up the data as given in the various authorities, especially the newer books as they come in, that is the ones that we did not have in the library.

Q. What works did you begin to consult since the beginning of 1906?

A. Well, I don't know that I began to consult any that I had not previously consulted.

Q. Well, what particular theoretical studies of the subject of white pigments did you make since the beginning of this year?

A. Well, as given in Sabin for instance.

Q. You had not consulted Sabin before?

A. Yes, sir, I had.

Q. What particular subject did you study in Sabin since 1906?

A. I have read practically all that he has said about the subject of pigments, both during 1905 and perhaps again in part or full in 1906.

Q. Do you mean that you have re-read topics on other white pigments in Sabin's work during 1906 which you had read before, to straighten your impressions?

A. Yes sir.

406 Q. But you did not get any new information on the subject since the beginning of 1906 from the study of books that you had not prior to the beginning of the year 1907?

A. Why yes I think I did.

Q. Well, now tell me what that was.

A. That was more particularly with regard to the working qualities or the use of these pigments or ingredients in the manufacture of paint.

Q. In what book did you study this subject?

A. As far as they have given them in Sabin and Hurst and in Hooker's little work and Smith's, which is the most recent that we have in the library.

Q. Have you not read the same topics in those books before the beginning of 1906?

A. Yes, I think probably I had, that is some of them at least but not all of them.

Q. Then it is true, is it not, that while you have re-read on the subject of the property of white pigments, since the beginning of 1906, you did not have up any new studies on that subject?

A. A continuation of the same subject.

Q. A continuation of the same subject?

A. Yes sir.

Q. And a re-reading of the same matter?

A. Yes sir.

Q. Have you made any particular tests or experiments
407 with various mixed paints containing a variety of combinations of all of the pigments that we have discussed here this morning?

A. No sir?

Q. You never made any particular tests?

A. Only so far as the analysis of the paints themselves.

Q. But I am making a distinction between the analysis of the paints, of the contents of the paints, and particular tests as to their working in actual use?

A. No sir.

Q. I ask you whether you ever made any particular tests?

A. No sir, I have not.

Q. Then when you speak of a paint working easily under the brush, you do not speak from any particular experience on that subject do you?

A. No sir, only the knowledge and information gathered from recognized authorities.

Q. I asked you whether you had gained any such knowledge from practical experiments, and 'no' would be an answer to that question.

A. Not with a brush, no sir.

Q. Have you made any particular tests of these paints with anything else than a brush?

A. No sir, not in the sense you are using it.

Q. Have you ever observed how any mixed paint, the composition of which was known to you from chemical analysis, behaved under exposure?

A. The observation as I have seen it on the building.

Q. Had you examined the paints under those conditions
408 to know what was in the paints?

A. I had examined that particular paint.

Q. You are speaking of one particular instance?

A. One particular instance, only.

Q. What was that particular instance?

A. The paint I used upon my own house.

Q. And whose paint was that?

A. It was Sherwin-Williams'.

Q. You had examined that chemically to find its composition?

A. I had.
Q. When was that?
A. The first examination was made probably either twelve or thirteen years ago.
Q. And you know how that paint behaved?
A. Yes sir.
Q. And had you any way of comparing the behavior of that paint with the behavior of some other paint whose composition was known to you?
A. No, I had not.
Q. And this is the only instance where you observed the actual behavior of paint under exposure where you knew the composition of the paint?
A. Those two instances, or two occasions of the same paint.
Q. And two occasions of the same paint used by you for your own *y*ouse?
A. Yes sir.
Q. What was the color of that paint Professor?
A. The first paint was yellow, and a deeper yellow and a
409 white. The second paint was a white and a green.
Q. Can you tell us what the coloring matter was in the green?
A. No sir. The determination of the coloring matter was not made, but the determination of the presence of lead and zinc and calcium.
Q. Anything else?
A. And the oil.
Q. I am talking about pigments.
A. No sir, not any pigments, no sir.
Q. Zinc, lead and calcium?
A. Yes sir.
Q. Had you at that time sufficiently progressed in your knowledge of how to analyze and distinguish between various elements to determine whether the lead was what it commercially known as pure carbonate of lead or whether it was lead sulphate?
A. Yes sir, I think we had.
Q. Had you determined definitely that it was carbonate of lead?
A. We found in the samples that we examined, that is—I could not say it was even commercially pure, for I have not the figures with me.
Q. It was this last time that you painted your house with Sherwin-Williams paint?
A. Five years ago—four years ago rather.
Q. The paint is on the house yet?
A. Yes sir.
410 *Q. The paint is on the house yet?*
A. Yes, sir.
Q. Satisfactory?
A. This last time I cannot say that it is.
Q. The first time it was?
A. The first time it was.

Q. When you speak of the combination formed between the lead hydroxide present in the ordinary carbonate of lead with the linseed oil, and when you speak of a combination or a lack of combination of chemical elements in other pigments with linseed oil, do I understand you to say that you speak of them only from book knowledge?

A. No, sir, not wholly. I have made some examinations, but not so that I would want to be quoted as an authority.

Q. Then when you do express an opinion on that subject it is based entirely upon what you have read in books upon the subject?

A. Confirmed by what studies we have made, yes, sir.

Q. The element in the commercial carbonate of lead which, according to your opinion, forms a chemical combination with linseed oil and gives to the paint wherein that pigment is used a useful quality is the lead hydroxide. Is that correct?

A. Supposed to be. Yes, sir.

Q. According to that the more lead hydroxide there would be in carbonate of lead the better it would be?

411 A. Not necessarily.

Q. Why not?

A. Because there might be so much of it in the combination that it would cease to have the same re-action and have the same protection from the lead carbonate that is present also. It is a modifying influence.

Q. Up to what per cent. should lead hydroxide be present in carbonate of lead in order to give it this useful quality?

A. It is generally recognized at about 31 per cent. That is there is two parts of lead carbonate and one of the hydroxide. If I remember correctly it would be 31 per cent. to 69 per cent.

Q. Then if they were not present, what would you say?

A. I could not say just what the range of usefulness would be. I have not experimented along that line enough to determine that or to know.

Q. Suppose it should contain as much as 35 per cent., would that exceed the limit of usefulness?

A. Well, I could not say.

Q. Suppose it should go as far as 40 per cent., would that make the pigment an inferior article?

A. I should expect it would. But I would not want to say positively without investigation.

Q. Suppose it should contain only 25 per cent. of lead hydroxide, would you regard it as lacking this useful quality?

412 A. I could not say how wide the range would be.

Q. Suppose it would contain only 20 per cent. of the lead hydroxide.

A. Well, I would expect it would not form as good a product.

Q. At any rate, as the purity of the carbon of lead chemically speaking increases, the usefulness of the pigment decreases. Is that correct?

A. That is you mean towards the pure carbonate and not the basiccarbonate?

Q. That is it?

A. That is what I understand from my studies, that up to a certain per cent., yes, sir.

Q. Suppose the hydrate should fall as low as 8 per cent., what would you then say?

A. I would not expect as good results as I would from that which was recognized as producing a more superior product.

Q. Now which of these various authorities that we have cited, did you regard as the highest?

A. In this country, I think Sabin is one of the highest authorities that we have, and in England Hurst and Church, I think, are recognized as two of the highest authorities.

Q. Have you any preference among them?

A. Well, I don't know but that they each deal with different topics, and I don't know as I would have. I think as a practical paint man that Hurst would stand higher. Perhaps on the theory Church might stand higher.

413

Q. Who would stand the higher as an authority on the value of the various white pigments?

A. Well, I would say those two men would be as good authorities in Europe or England and Sabin in this country.

Q. I mean as between Hurst and Church.

A. Well, I should hardly know which of them should be considered.

Q. You would not be able to tell?

A. No, sir, not personally knowing them.

Q. Not personally knowing whom?

A. Either Hurst or Church.

Q. But you know their works?

A. Yes, but I meant, knowing the opportunities they had for study and the work they done.

Q. Is it not true that Sabin has dealt more particularly with the liquid ingredients of paint than with the solid?

A. In this book he has, yes, sir.

Q. Well, we are talking now about the books.

A. Certainly.

Q. Of Sabin?

A. Yes, sir.

Q. You have not imbibed any knowledge from him personally other than from his books, have you?

A. I never have met him, no sir.

414

Q. Then so far as his writings are concerned, they principally deal with varnish and other liquid products used in the paint trade?

A. More largely than that with the pigments?

Q. And as an authority on the value of pigments, Sabin would not compare with the English authorities, with whom you have mentioned?

A. Well, from the information I can gather I should say that he would compare with them.

Q. Had you made a study of Sabin's works prior to the beginning of 1906?

A. Yes, sir, that is, I had his work. I could not say just the date that I got it, but probably in August. I cannot say exactly.

Q. Can you tell me why in your bulletin you quote Hurst repeatedly and not Sabin?

A. I have quoted Sabin.

Q. On the question of the value of white pigments?

A. I quoted him on page 589.

Q. On class B only?

A. Yes, sir.

Q. Why have you not quoted him on class A or on the statutory pigments?

A. Sublimed lead, as far as I can remember, is not dealt
415 of by him. I may be mistaken in that without looking.

Q. Well, the fact of the matter is, is is not, Professor, that Sabin's works does not go very fully into the question of white pigments, not certainly to the same extent that Hirst does?

A. Not to the same extent, for he is dealing more largely with the other phases of the paint questions.

Q. I judge from your bulletin you have accepted quite readily the conclusions reached by Hurst in his work, have you not?

A. Yes, sir, to a considerable extent.

Q. You certainly regard him as a higher authority on paint chemistry and technology than you claim yourself to be, do you not?

A. I do, surely.

Q. When you speak of the amount of carbonate of lead that was produced in 1905, and gave it as 200,000 tons, what is the source of that impression?

A. By correspondence with men who know something of the industry, trying to gather where I could find it, and I could not find it. I don't have access to the published literature that would furnish the data for 1905.

Q. Well, then, you are simply testifying to something which really somebody else said, and the man that gave you the information would be more competent to testify?

A. That is what I testified for 1905, according to the best
416 information I could gather.

Q. You have no official statistics on the subject referring to 1905?

A. No, sir, none any ways available to me.

Q. Now, in all the estimates which you gave in your testimony as to the annual production of carbonate of lead, for the various years that you have mentioned, you do not mean to say that that amount of carbonate of lead was used in the paint trade?

A. No, sir, that was the amount produced and used.

Q. You know that there are quite a number of important uses for carbonate of lead other than in paint?

A. Certainly.

Q. As a chemist and speaking generally do you regard the various carbonates as complete chemical bodies?

A. That is as a complete chemical compound.

Q. As a complete chemical compound which has no affinity towards other chemical bodies?

A. Not without replacing, that is if it is a neutral carbonate not without replacing one of the constituents it has.

Q. Assume that the linseed oil should contain free acid?

A. Yes, sir.

Q. Is there not an affinity on the part of carbonate of lead to combine with those acids?

417 A. Yes sir.

Q. Is there not an affinity on the part of carbonate of lead to combine with those acids?

A. Not until there has been decomposition of the carbonate and carbon gas.

Q. Is not decomposition the very thing that is produced as the result of this affinity between the carbonate of lead and the free acids of linseed oil?

A. Yes sir.

Q. Now is that tendency to combine present?

A. The tendency to decompose the carbonate and unite with the acid and neutralize the acid and form a salt stronger than the carbonate is always present.

Q. Now, there is a still stronger tendency on the part of the lead hydroxide to combine with the free acids in the linseed oil, is there not?

A. Yes probably there is.

Q. And what is the effect of that chemical combination?

A. It depends upon what the acid is.

Q. Assume that the acid, the free acid in the linseed oil is linoleic acid, what then?

A. If it would be free linoleic acid, it would be lead linoleate.

Q. Now, then, this formation of the lead linoleate is also

418 called lead soap is it not?

A. Yes sir.

Q. Now, the formation of that lead soap could not take place except by taking some element from the linseed oul and some element from the lead hydroxide or carbonate of lead, could it?

A. As it combines with the linoleic acid which is but an unsaturated acid and the lead hydrate to form a salt.

Q. Now, this chemical combination that we have spoken of works to a certain extent a disintegration of the linseed oil does it not?

A. No, I don't think it does. I would not say that it did chemically. It combines with the product, which is not a saturated acid to form a salt, the lead linoleate and that part of it, I should say, was not rendering it unstable.

Q. How about the effect upon the carbonate of lead of the lead linoleate?

A. The remaining portion — gradually re-acts upon that is the lead carbonate upon the linseed oil and forms a product which is decomposed in the paint when it is exposed to the surface, on the surface.

Q. Well, what makes it so?

A. What is that?
Q. What makes it so?
A. From the gradual chemical change or the union which takes place between the two and the action of the atmosphere upon it.
419 Q. Now, does not that result in chalking?
A. That results in the wearing away and the chalking of the surface.
Q. The drying effect of the lead is greater than that of the other pigments, is it not?
A. Yes sir.
Q. Then, this decomposition that you have just mentioned produces a greater amount of chalking in the case of lead than it does in the case of another pigment that would not dry so freely? Is not that so?
A. Not necessarily, I don't think. In chalking, the change takes place from the surface. It gradually works into the material.
Q. Compare the tendency to chalk of carbonate of lead in its commercial form, when used as a pigment in mixed paints, with the tendency in the same direction of zinc oxide?
A. The two products act different. The carbonate gradually chalks and wears on the surface while the zinc forms a hard covering that is more liable to crack.
Q. Crack and peel?
A. Yes sir, so the two actions are not the same at all.
Q. But to far as chalking is concerned, carbonate of lead
420 chalks more readily that oxide of zinc or zinc from western ores or zinc lead does it not?
A. Yes sir, it chalks more on the surface but does not crack.
Q. I am speaking particularly of chalking now?
A. Yes sir.
Q. And it chalks more readily than sublimed white lead does it not?
A. So far as chalking is concerned, it does, yes sir.
Q. How about the effect of the presence of sulphur gas in the air upon carbonate of lead?
A. It tends to darken, the combination of the sulphur compounds with the lead.
Q. What brings that about?
A. From the action of the sulphur upon the lead, forming a sulphur compound with the lead.
Q. In a white paint, a paint which is found to be white, that is of course, quite a serious matter is it not?
A. Where there is a sulphur in that form, combined with the lead, there would be.
Q. I have assumed that in my question, upon the basis of your previous answer?
A. Yes sir.
Q. Does that same danger exist in the case of oxide of zinc?
A. No sir.
Q. Does it exist in the case of sublimed lead?

A. No sir.

421 Q. Does it exist in the case of zinc lead white?

A. Not if it was pure.

Q. Well, I am speaking of the zinc lead white as you have given the analysis in your bulletin?

A. No sir, not to the extent that it does with the lead carbonate.

Q. And now does the same danger exist in the case of zinc from western ores?

A. No sir.

Q. Does this blackening effect of sulphur gas exist in the case of lithopone?

A. No sir.

Q. Does it exist in the case of the class B pigments?

A. No sir, they are inert.

Q. Do you regard a mixed paint wherein only carbonate of lead is used as the best kind of paint that can be made?

A. I consider that it is the only pigment that can be used alone.

Q. That is not my question.

A. Then I would say might be,——

Q. My question is this. Do you regard a mixed paint wherein carbonate of lead is the only pigment used as being the best paint that can be produced with our present knowledge of technology of paint?

A. If I had I should not have recommended that zinc be included as one of the statutory pigments.

422 Q. Don't argue with me, Professor Ladd, but just answer my question, please.

A. No sir, the addition of zinc——

Q. My question is, do you regard a mixed paint made only of carbonate of lead as the sole pigment as being as good a paint as can be produced? Yes or no to that.

A. No.

Q. Do you regard a mixed paint wherein oxide of zinc is the only pigment as being the best that can be made at the present time?

A. You mean without the presence of lead?

Q. My question was very explicit and included that element?

A. And included the——

Q. The element of its being the sole pigment.

A. No.

Q. You regard that a combination of carbonate of lead and oxide of zinc as pigments in mixed paint as tending to produce a better paint than could be produced by the use of either one of the statutory pigments alone?

A. In my judgment, yes.

Q. Is there any proportion in which these statutory pigments should be combined which you regard as producing better effects than any other one combination?

A. In my judgment and from my own use, yes sir.

Q. What is that combination?

423 A. If all the other conditions were right I should say that I would prefer where there were two parts of lead to one of zinc or thereabouts.

Q. What is that based upon?

A. Well, the addition of the zinc would harden it and not enough zinc would have been added to permit of any cracking and therefore I would get better results chemically than I would if no larger proportion of zinc were used.

Q. Lead is much softer than zinc, of course?

A. Yes sir.

Q. And the addition of zinc is good for the purpose of adding hardness?

A. Hardness.

Q. And your judgment is that if more than one third of the total pigment body is formed by zinc, than that would be too much of a good thing in the way of hardness?

A. Well, I would not say it that way, exactly. I say that for myself and from my present knowledge I should prefer that proportion, but just what the limit might be I would not attempt to say.

Q. Have you informed yourself as to the best opinion on the subject, as to which is the most ideal percentage of those two statutory pigments to be used in a combination?

A. It would depend upon where the paint was to be used,
424 judging from the analysis which I have made.

Q. I am speaking of the theoretical opinion which you have studied. Is there any concensus of opinion on the subject?

A. Why, some authorities have stated that there should be a large-proportion of lead than zinc, but I don't know whether there is a concensus of opinion or not.

Q. Well, what do the best authorities s-y on the subject?

A. Well, I think the best authorities for outside white are not far from the figures that I indicated.

Q. Two-thirds of the carbonate of lead to one-third of zinc?

A. Yes sir.

Q. If zinc were used in excess of fifty (50) per cent. of the total pigment in that combination, you would certainly regard that as adding too much jardness to the paint, would you?

A. For outside purpose it would *be*, in my judgment, be more likely to crack.

Q. Has not zinc a tendency to spread too far?

A. Yes sir.

Q. And has not carbonate of lead a tendency to contract too much?

A. When used alone, you mean?

Q. Yes?

A. It may have.

Q. In other words, carbonate of lead has not by itself sufficient spreading power?

A. Well, I don't know as I would say that. I should say that if used with oi*t* and the proper consistency for spreading it
425 would not necessarily be objectionable in that respect, but if not enough oil was used perhaps it would be.

Q. Now, if you add enough oil to give to carbonate of lead sufficient spreading power, would it not sag and run down?

A. It might have that tendency, depending something perhaps upon the character of the oil, as well.

Q. Of course, all these answers that you give to us are from a theoretical consideration of the subject on your part and not from a technical or an experimental consideration?

A. These at the present time are so, yes sir.

Q. Does not carbonate of lead have a tendency, if used alone, in mixed paint, to harden in the can and to settle at the bottom?

A. I think it has a tendency to settle at the bottom, yes sir.

Q. Has it not a tendency to harden, to leave the vehicle, to become separated from the thinner?

A. It settles, yes sir.

Q. Is that an objection?

A. Why, it is an objection on the part of the painter that he is not as likely to mix it as thoroughly with the paddle.

Q. Does it not occur that a painter cannot mix it again with the linseed oil to the proper consistency?

A. I think that if the oil was pure and a good grade and
426 a good grade of lead carbonate, it can be mixed.

Q. Well, how good would the grade of lead carbonate have to be in order to overcome that objection?

A. Well, the pure commercial product on the market.

Q. Well, there are quite a number of different degrees of goodness in carbonate of lead then, are there?

A. There is some variation from the analysis shown.

Q. Are those variations slight?

A. In the product as made at the present time, with which I am familiar, the analysis does not show but a slight range.

Q. Have you examined the commercial article, carbonate of lead in its various forms as separated from its being an ingredient of paint?

A. Not to make a chemical analysis, myself, no sir.

Q. Have you examined it for the purpose of making a physical examination of it?

A. Well, in mixing it up, yes sir.

Q. In mixing it with what?

A. In mixing it with the oils in it already contained in the cans.

Q. You say that you have examined carbonate of lead in the shape of lead ground in oil.

A. Yes sir.

Q. But not of the commercial powder?

A. No sir.

Q. You have not made either a chemical or physical ex-
427 amination of that?

A. Yes sir.

Q. Or of any of the various grades of carbonate of lead?

A. No sir.

Q. A good deal of mixed paint is sold directly to the householder is it not, particularly in the State of North Dakota?

A. The majority of it is sold to the householder.
Q. Direct?
A. Direct.
Q. He does not in the majority of cases employ a painter to do the painting, does he?
A. Yes, I think the majority of cases they employ a painter.
Q. But in a great many cases does not the householder use the paint himself, apply it himself to the surface?
A. In many instances, yes sir.
Q. Now a householder, he is not a skilled painter would have considerable difficulty in stirring up a can of paint in which the pigments had hardened and settled, would he not?
A. I did it as a boy.
Q. Well, you may have been particularly smart, Professor Ladd, but we are talking about the average of mankind.
A. Well, I don't know; you could do it.
Q. Perhaps you showed in your early youth the intellect for becoming a paint expert.
A. I had to do some painting.
Q. Did you experience such difficulty when you were a
428 boy—I mean, did you find in the can that the pigment had settled?
A. Yes sir, it was necessary to mix it thoroughly with the oil.
Q. And have you any idea as to what the pigment was composed of?
A. The pigment was supposed to be the best grade of white lead that we could purchase at that time. Its chemical composition I have no knowledge of.
Q. It was white lead in oil that you bought?
A. It was ground in oil.
Q. White lead ground in oil?
A. Yes sir.
Q. And that was carbonate of lead ground in oil?
A. Supposed to be. I had no knowledge of chrmistry at that time.
Q. And was that mixed paint?
A. That is, it was ground in oil to be mixed with another oil.
Q. But it was not mixed paint?
A. Probably not in the sense it was a mixed combination paint.
Q. When we talk of mixed paint, I assume that both you and I understand that word as having one meaning, namely: a
429 paint which has so much linseed oil as to give it the proper consistency and make it ready to be applied to the surface, as soon as the can is opened?
A. Not all of these analyzed have been in that condition.
Q. We are not talking about these that were analyzed, but the sense in which we have right along been using the term 'mixed paint.' Then you didn't have any experience as a boy with a can of mixed paint where the pigment had settled?
A. At that time I never saw mixed paint.

Q. Did you ever know mixed paint that contained only carbonate of lead.

A. No sir.

Whereupon an adjournment was taken until 2:30 P. M. of this day.

430 MONDAY, *February* 5, 1906—2.00 p. m.

E. F. LADD, Recalled.

Cross-examination resumed by Mr. ZEISLER:

Q. Did I understand you to say, Professor Ladd, that this bulletin number 67 was published by you in anticipation of any injunction that might be obtained?

A. Yes sir.

Q. Had you had any indication given to you that an injunction to restrain you from publishing bulletins was going to be sought?

A. I gathered from information that came to me that a restraining order or injunction would be asked for and that it would include the publishing or enforcing of the law until such time as the constitutionality of the law could be passed upon.

Q. Well, the publishing of bulletins is entirely independent of enforcing the law, isn't it.

A. Yes.

Q. But you feared that you might be restrained from publishing bulletins?

A. I had been given to understand that that would probably be the course.

Q. By whom?

A. By several with whom I was in conversation, and I gathered from the conversation when you and Mr. Heath and others were present that such might be the course, although it was not stated in that way.

Q. It was merely an inference of your's, wasn't it?

A. Well, you and Mr. Heath went particularly into the conditions of publishing bulletine and so on, which strengthened the belief.

Q. Well, it was only an inference?

A. That is all; it wasn't positive information.

431 Q. And, fearing that you might be enjoined from publishing your views on the ingredients of paints and the analysis you had made, you rushed into print with this bulletin?

A. I felt that the information or the analyses of the paints should be furnished to the public.

Q. Now, what reason did you have to publish your views in regard to the ingredients of paints?

A. We wanted to give a discussion of the subject as far as the information was available, and to do it in as fair and complete a way as we knew how with the information which was available at that time, and without drawing any conclusions.

Mr. ZEISLER: I will offer in evidence at this point, for the pur-

pose of impeaching the statement of the witness in regard to the qualities of various white pigments, so much of bulletin number 67 attached as an exhibit to the affidavit of Professor Ladd, filed in this case, as follows the heading "The White Pigments" on page 581, all of pages 582, 583, 584, 585, 586 and 587, to the middle of the page, including the paragraph regarding silica.

Q. Did you mean to be understood, in your testimony on direct examination, that carbonate of lead has greater hiding power than any other pigment?

A. No, I don't think I stated it that way, than any other pigment which was used mixed with oil to the consistency for use as a paint, any single.

Q. Do you maintain that the hiding power of carbonate of lead, when used as a pigment in mixed paint, is greater than the hiding power of any other pigment or combination of pigments that

432 could be used in mixed paint?

A. I didn't say combination of pigments at all.

Q. What is your answer to the question?

A. I stated that, in my judgment, and from the best information that I could gather, there was no single pigment combined with linseed oil which, in proportion to working consistency, possessed all of the good qualities of hiding power, of obscuring protection that is found in the white lead.

Q. You have told me something which is entirely distant from being an answer to my question. Do you maintain that the hiding power of carbonate of lead, used as a pigment in mixed paint, is greater than the hiding power of any other pigment or any combination of other pigments? Yes or no to that?

A. I do not know.

Q. Do you maintain that?

A. Do I maintain what?

Q. That the hiding power of carbonate of lead is greater than as I state.

A. I never have stated that it was.

Q. I am not saying that you have stated, but you can answer my question, whether you so maintain now?

A. No sir, I do not.

Q. What other white pigments are there that have greater hiding power than carbonate of lead?

A. Well, lithopone may have greater hiding power, so far as I may know, and some of the others may have, but if so, I couldn't say.

Q. How about sublimed lead?

A. It may have.

Q. In other words, your tests and experiments and your study on the subject hasn't yet enabled you to form any valuable judgment on that question?

A. Not from a practical test, no sir; it is too short a time.

433 Q. Is that a matter that can be settled by the theory of chemistry?

A. No sir.

Q. That can only be settled as a matter of practical experience can it not?

A. Fully, yes sir.

Q. You agree with that statement?

A. I do.

Q. And the oxide of zinc which comes from the New Jersey mines contains absolutely no sulphate of lead, does it?

A. Some of the analyses seem to indicate a slight amount: I couldn't say.

Q. Any analyses that you have made?

A. No sir, not any that I have made.

Q. Whose analyses are you now referring to?

A. The compiled analyses as given in different books, including Ellis's. I couldn't say whar ones were from New Jersey and what was not, because in all instances they are not given.

Q. Very well, then. Can you point to a single analysis of New Jersey zinc by any reputable authority, which contains the presence of sulphate of lead?

A. No sir I could not.

Q. The oxide of zinc coming from New Jersey is practically pure oxide of zinc, is it not?

A. It is so purified, yes sir.

Q. Now when you come to zinc from western ores, doesn't the ore there always carry sulphate of lead?

A. I think the ore does.

Q. Have you ever known of any oxide of zinc from western ores, in its commercial form, that does not carry a percentage of sulphate of lead?

A. I haven't analyzed any that did not, or examined any.

434 Q. Can you point to an analysis by any reputable authority showing that zinc from western ores did not carry a percentage of sulphate of lead?

A. I couldn't at this time, no sir.

Q. Now, this zinc from western ores carries a widely varying percentage of subjects of lead in its natural composition does it not?

A. Yes sir.

Q. It varies all the way from two to three per cent. up to how many per cent.?

A. I couldn't say what the maximum range is based on the analyses of the paints which are supposed to contain it. I should say it might run up to 18 or 20. From what I know, it might go up much more than that. I couldn't state what the full range would be.

Q. You have never analyzed the commercial zinc from western ores?

A. Not a variety of them, no sir, not a range of them.

Q. Have you examined any sample of it?

A. We have two or three samples of the western mineral ore, but the analysis isn't completed.

Q. I am not speaking of it as an ingredient of mixed paint, but I am speaking of it in its natural commercial state.

A. Yes sir, that is what I have reference to.

Q. You have not completed any of the analyses?

A. No sir.

Q. And two or three samples is all that you have had submitted?

A. Of that product, yes.

Q. Have you compared its physical condition with that of the eastern zinc?

A. No sir, not to make a study of it.

Q. And you have no judgment now as to how the physical
435 condition of the zinc from western ores compares with that of oxide of zinc, so-called?

A. No sir.

Q. Is there a method of determining by the examination of a sample as to what percentage of sulphate of lead is present in a certain lot of zinc from western ores?

A. Yes.

Q. That method of examination is open to anybody who understands how to make the test?

A. Yes sir.

Q. Suppose that a manufacturer should give an order for a lot of western zinc carrying five per cent. of lead sulphate, would there be any difficulty about supplying him with that article?

A. I couldn't say what the supply——

Q. You don't know of any difficulty that there would be?

A. I don't know of any myself.

Q. And you don't know of any difficulty that would exist regarding supplying a manufacturer with what he desired if he should specify zinc from western ores carrying 10 per cent. or 15 per cent. of sulphate of lead?

A. As far as I personally know, I don't.

Q. Why do you qualify it by saying as far as you personally know?

A. Because I have not made any special investigation to determine that.

Q. Then what is the meaning of the word "personally" there?

A. Well, I have been told by those who handle the product and there are at least three well recognized grades.

Q. Yes, but have you been told by anybody whose information is reliable that there is any difficulty about supplying any particular grade of zinc if it is specified? For instance, western
436 zinc carrying ten per cent. of lead sulphate.

—. I don't know how close the limits are.

Q. I ask you whether you have been informed by any person whose information is reliable that there exists a difficulty about supplying such a grade of zinc from western ores, assuming that there is such zinc from western ores as carries in its natural composition ten per cent. of lead sulphate.

A. I have not.

Q. Then the word "personally" in your answer previously had really no meaning, had it?

A. That is, that I didn't know myself, that I had no information on the subject.

Q. And you don't know that anybody else has any information on the subject?

A. I haven't looked it up to see that they have.

Q. Assume that a manufacturer who desired to have in his paint a certain percentage of lead sulphate in combination with oxide of zinc, and suppose that the zinc from western ores which he uses does not contain that degree or percentage of lead sulphate which he desires to have in his paint: is there some method by which that deficiency can be supplied?

A. Do you mean increase the amount of lead?

Q. Increase the amount of sulphate of lead.

A. I should suppose it could be had from the Canon City product, which is richer.

Q. Now by the addition of the Canon City product the manufacturer could supply that deficiency of lead sulphate, couldn't he?

A. If he wanted more of the lead sulphate.

Q. Exactly. If he wanted more of the lead sulphate, he could get it by using sublimed lead, couldn't he?

A. Yes sir.

437 Q. What is the reason why you regard variability of composition as an objectionable feature?

A. Well, according to the best authorities—take, for instance, zinc sulphate: according to Ellis, which is introduced into the testimony here, the zinc sulphate is present in variable quantities and if there is present a considerable quality it would form a soluble salt that would be objectionable.

Q. We will come to the zinc sulphate in a moment.

A. Well, you asked for variability. And if it is lead sulphate you take the statement of Mr. Hooker that was introduced this morning, that a small amount is not objectionable—that is, I don't know as those are the words.

Q. He doesn't say it is not objectionable: he says it is not of any consequence, that is, it has no effect one way or the other: is not that what he means?

A. No, I wouldn't say that was the exact idea that he conveyed at the time.

Q. Well, it is not what you understand——

A. He gives the impression that, if there is a larger amount, it does become objectionable.

Q. That is your understanding of it, your interpretation of the language?

A. That is my interpretation of the language, yes sir.

Q. Exactly. Don't let us talk about zinc sulphate. We are talking about the variability of the percentage of lead sulphate.

A. Yes.

Q. We will treat the other separately. What is the reason
438 why you regard the variabilities in the amount of lead sulphate carried by zinc from western ores as an objection?

A. In the first place, the lack of uniformity.

Q. That is simply saying the same thing. Why is that lack of uniformity an objection?

A. Because, if one has to secure a certain result, if you change the chemical composition of a product you would be likely to change the results which you secure and, if there is no uniformity in composition then, if there were no other objections, this would be an objection in itself.

Q. Is there an objection from the manufacturers point of view or is that an objection from the man who insists upon only good pigments going into paint?

A. From information that I have been able to gather, it is from both.

Q. In what way is it an objection from the point of view of the man desiring only good pigments going into paint?

A. That the concensus of opinion, based on years of experience, indicates that certain other pigments are the standard for comparison or the recognized pigments of the best quality.

Q. You are not answering my question, Professor Ladd: it seems to me you are evading me.

A. No, I am attempting to answer it.

Q. Let us assume that there are various grades of zinc from western ores, one grade carrying five per cent. of lead sulphate, another grade containing ten per cent. of lead sulphate and another containing fifteen per cent. of lead sulphate. Assume that those were the three grades. Assume that lead sulphate is a decidedly objectionable ingredient. Then all three would be objectionable, wouldn't
439 they, only one more so than the other? Isn't that right?

A. Not necessarily, but within certain limits yes.

Q. Now then, if, on the other hand, lead sulphate is a valuable ingredient, then what way does the variability form an objection to zinc from western ores as pigment?

A. Well, that is assuming that it has no objectionable qualities?

Q. I am assuming that for the purpose of this question, yes.

A. Well, if it hasn't any objectionable qualities in any proportion, then there wouldn't be any objection.

Q. Now has the objectionable feature of sulphate of lead, if there is such an objection, anything to do with the question of the variableness of the composition? In other words, does the variableness in itself form an additional objection?

A. Yes, I should say it did.

Q. In what way?

A. That if there was a variableness and that variation was running through a large range, the results might not be the same for one that contained a large amount that they would for one that contained a small amount when mixed with the other pigments.

Q. In other words, you mean that there would be a degree of objectionability?

A. Yes.

Q. And the greater the amount of lead sulphate, the greater would be the objection: Is that it?

A. Within certain limits, yes.

Q. Assume an objection, however, that contains nothing
440 but valuable ingredients, and there is variability of composition: wherein lies the objection to the variability?

A. Well, I should say if one of the variable constituents is more valuable than the other, then the variation or variability would form a feature.

Q. Isn't that a matter which the manufacturer is to take care of by the addition of that portion of the element of which there is a deficiency in the lot of pigment which he buys? Can he not take care of that?

A. I don't know whether he can or not. I doubt it always.

Q. You don't know about that?

A. No. I doubt it.

Q. You regard variability, then as a decidedly objectionable feature, do you?

A. It depends upon the range of variability and the character of the product which varies.

Q. How large must be the range of variability in order that it shall be an objection in your eyes?

A. That would depend entirely upon the constituent that you are dealing with. If it was a sulphur dioxide, it would be classed in a group by itself, or if it were lead sulphate as compared with sublimed white lead——

Q. I am speaking now of pigments composed of all useful and unobjectionable ingredients. Within what range must that variability exist in order that you shall stamp it as an objection?

A. That I am not prepared to say.

Q. You don't know?

A. I am not prepared to say.

Q. Which do you regard as the more valuable of the in-
441 gredients *on* carbonate of lead, the carbonate Pb Co3 or the lead hydroxide PbH2O2?

A. Well, it would not be white lead if it didn't contain them both.

Q. Which do you regard as the most valuable ingredient?

A. I couldn't say as the two are not separated and work differently and they are both in the combination together.

Q. Doesn't something depend upon the percentage of the combination?

A. It is recognized that they usually exist for the best results in two parts of the first to one of the latter or thereabouts.

Q. Then, if there *us* a preponderance above that limit of percentage which you have now indicated as being the most valuable combination, to that extent the variation would be a detriment, would it?

A. It might be.

Q. Don't you know?

A. I am not prepared to say, no sir.

Q. Why are you not prepared to say?

A. Because I have made no investigations that would enable me to speak authoritatively as to the range and the effect of the variation.

Q. Has your study of the effect of the variability of zinc from western ores been more thorough than your study of the effect of the variability in the composition of commercial carbonate of lead?

A. No sir.

Q. Has your study of the effect of the variability of sublimed white lead been more thorough than your study of the effect of the variability of the composition of carbonate of lead?

A. No sir.

442 Q. Then your information or lack of information is the same as to all three?

A. In that respect, yes sir.

Q. I call your attention to a number of analyses of white leads, seven of them, given on page 42 of the third edition of Hurst's work entitled "Painters' Colors, Oils and Varnishes," published in London, 1901. You have a copy of that in your hand, have you, Professor?

A. Yes sir.

Q. The author there first gives the analyses by showing the contents of lead monoxide, carbonic acid and water, and thereupon states that from these said analyses the composition of the white leads analyzed by him can be calculated to be as follows, and then follow seven analyses showing the contents of lead carbonate and lead hydroxide; is that correct?

A. Yes sir.

Q. Now, state whether I give correctly a quotation of the analyses thus reached by Mr. Hurst: "Lead carbonate, PbCO3, 63.35, 72.15, 91.21, 71.93, 87.42, 68.36, 70.87; lead hydroxide, PbH2O2, 36.14, 27.68, 8.21, 27.88, 12.33, 31.64, 28.66." Did I correctly state it?

A. You did.

Q. State whether or not, on the same page just before the statement of the analyses of white leads, the author uses the following language: "It is scarcely necessary to point out that, as white lead is made by many processes, it must necessarily vary in composition: indeed the white lead yields by the same process do not always have the same composition, as is evidenced by the analyses given here and on page 20; these have been collected from variety of sources." Have I correctly quoted?

A. Yes sir.

443 Q. Below the statement of analyses of white leads, Mr. Hurst, on the same page, mentions seven different kinds of making carbonate of lead or white lead?

A. Yes sir.

Q. I will ask you to state whether this variability *has* shown by these seven analyses of white leads, as given by Mr. Hurst, s*j*ows a greater range of variation than the two analyses of sublimed white lead which he gives on page 54 of the same work?

A. If you compare the figures as given, it gives as wide a range.

Q. Doesn't it give a considerably wider range?

A. It may be a wider. On 54?

Q. What I mean is, isn't the variation in white lead considerably

greater than the variation in sublimed white lead, so far as is shown by the analyses given by Mr. Hurst?

A. As those figures are quoted, yes.

Q. We find, for instance, a variation in the quantity of lead hydroxide from 8.21 up to 36.14, in the latter case there being about four and a half times as much lead hydroxide as in the first named by me. That is correct?

A. That is correct.

Q. You stated that, so far as you know, sublimed white lead is manufactured in the United States only by a single concern, the Picher Lead Company, of Joplin, Missouri?

A. That is the only one I know of personally.

Q. Do you know of any reason why any concern that desired to do so could not manufacture sublimed white lead?

A. I had understood that they controlled the patent but
444 that I don't know.

Q. How long have they manufactured this sublimed white lead?

A. I couldn't say exactly.

Q. I think you stated this morning that it is more than twenty years.

A. I think I stated this morning that it was about twenty years. It might be more or less.

Q. Don't you know that the life of a patent in this country is only seventeen years?

A. But it can be renewed.

Q. Are you sure about that?

A. That is my understanding, I don't know.

Q. Well, I think your understanding is wrong, Professor Ladd.

A. Is not sublimed white lead manufactured in England?

A. Yes sir.

Q. Was it not manufactured there before it was manufactured in the United States?

A. I couldn't say, but my impression is that it was.

Q. You stated in your direct examination that other authorities agreed with Hurst as to the variablity of sublimed white lead; which are those other authorities?

A. I think I stated that there was not very much information published, but, so far as I could find, what was said agreed with Hurst.

Q. What did you find that agreed with Hurst?

A. That is, statements that it was not uniform of composition.

Q. Where did you find that statement?

A. Well, without looking at the works again, I don't know as I can state.

Q. Then you simply have some recollection of having
445 somewhere read something upon that subject?

A. In some of these books wherever it is referred to.

Q. You don't know which one of these books it was.

A. Not without looking the matter up again.

Q. And I understand you are merely testifying to a recollection of something which you believe you have read some time ago?

A. Yes sir, recently.

Q. If recently, why don't you remember the source?

A. Because I have read too many of those things to keep every one in mind without having the works before me. I don't pretend to be an encyclopedia.

Q. Now, so far as the carbonate of lead is concerned, there are quite a number of processes used in this country for making white lead, are there not?

A. I think there are, several.

Q. There are many different kinds of making corroded white lead, are there not?

A. There are.

Q. There is a process know as Pattinson's, is there not?

A. I am not familiar with that, only I know the name.

Q. There is the process of Carter's White Lead?

A. Yes.

Q. And there is Bailey's white lead, is there not?

A. I recall the name but I couldn't place it or say that I am familiar with it.

Q. You don't know what the process is?

A. No sir, I don't.

Q. But you have a recollection of there being such a process?

A. I think I have, yes sir, I wouldn't be positive.

Q. And the Electrolitic process of making white lead?

446 A. Yes sir.

Q. Now, there are two general classes of white lead, so far as its physical condition is concerned, are ther- not, one being the globular and the other being the crystalline?

A. Yes sir.

Q. They are very different, are they not, in their action?

A. They seem to be, yes sir.

Q. Both, however, are known as carbonate of lead?

A. Yes sir.

Q. Now globular white lead is good white lead, is it not?

A. It is so recognized, yes sir.

Q. And the crystalline are the poorer in comparison?

A. The more objectionable one, yes sir.

Q. Is it not decidedly objectionable?

A. Yes sir.

Q. Will you please turn to page 54 of Hurst's work heretofore referred to. I desire to read what the author says under the head of Freeman's Non-poisonous White Lead: "The base of this white lead is the sulphate made from metallic lead by precipitation. It also contains zinc oxide, barytes, and, in the earlier makes, a little magnesia, all of the ingredients being mixed together by a process of grinding under edge runners, which causes them to be thoroughly incorporated together and, at the same time by consolidating the materials, increases the body or covering power. The pigments was first patented in 1882, but since then other patents have been taken

out for improvements in its composition, which, in consequence, has varied a little from time to time. The non-poisonous
447 white lead is a very good pigment, is more permanent under exposure to atmospheric influence than white lead, and is equal to white lead in body or covering power and in freedom of working. It is rather heavier than white lead, weighing about 180 to 190 pounds to the cubic foot. Its specific gravity is 5.95 to 6.00. It is one of the best substitutes for white lead which have been made." Have I correctly quoted?

A. You have.

Q. Do you know anything about this pigment?

A. No sir.

Q. Then you cannot dissent from the statement of Professor Hurst regarding it?

A. No sir.

Q. Now, the lead contained in this Freeman's Non-Poisonous White Lead *id* lead sulphate, is it not?

A. That is what he says.

Q. And is found there in a combination with zinc oxide and barytes?

A. Those are contained there with it, yes sir.

Q. Please turn to page 63 of this same work by Mr. Hurst. He speaks there, does he not, of the properties of zinc white?

A. On page 62 yes sir.

Q. Now on page 63 do I quote Mr. Hurst correctly? He says: "The chief fault of zinc white is its want of body which is not equal to that of white lead. Its covering power is rather better." That is correctly quoted?

A. Yes sir.

Q. And the last sentence of the same paragraph is as follows, is it not: "Its cost, want of body and want of freedom in working under the brush, have limited the use of zinc white much below that justified by its permanent qualities." Have I correctly quoted Mr. Hurst?

A. Yes sir.

448 Q. So, to judge from that, zinc white has the objection that it does not work well under the brush, has it not?

A. Yes, sir.

Q. And it wants body?

A. It wants body, yes, sir.

Q. When the author there speaks of covering power, he means what we have heretofore referred to as a *spreading* power, does he not?

A. Spreading power, I understand, yes, sir.

Q. How does the market price of zinc white compare with that of white lead?

A. I would rather give you the figures exact. Here is the last quotation: American white lead, dry or in oil, 7 *ro* 7½ cents; by the barrel 6½ to 7 cents. Zinc white, American, dry as to quantity and quality, 4½ to 5 cents and in oil 7 to 8 cents.

Q. And there is a difference of over two cents, is there not?

A. In the dry.

Q. Between the dry carbonate of lead and the dry zinc white?

A. Well, from 4½ to 5 for the dry and the lead dry from 6½ to 7, about two cents.

Q. Well, I say there is at least a difference of two cents?

A. Yes, sir.

Q. Turn back to page 44 of Mr. Hurst's work. Does he or does he not say there in the second paragraph as follows: "When exposed to light and air, white lead is fairly permanent and will resist exposure to normal conditions for a great length of time: on the other hand, when exposed to the fumes of sulphurated hydrogen and other sulphureous gases, white lead turns brown or black through the formulation of the black sulphide or lead." Have I correctly quoted?

449

A. Yes, sir.

Q. Would you judge from the next paragraph on page 44 that white lead cannot be used in connection with ultremarine?

A. Yes, sir.

Q. You would so judge?

A. Yes, sir.

Q. You are aware of the fact, Professor, are you not, that Mr. Hurst regards sublimed white lead as being more permanent than white lead?

A. I don't recall his statement at this moment on that.

Q. Look at page 54, the second paragraph following the analyses. Does he say or does he not say: "It is more permanent than white lead because sulphureous gases and vapors have little or no action upon it. It, therefore keeps its color longer when used in paint and exposed to air."

A. Yes, sir.

Q. Now, lead is a poisonous article, is it not, white lead?

A. White lead, yes, sir.

Q. Are you aware that there is a strong agitation in France to entirely forbid the use of white lead as a paint pigment?

A. I have seen such statements, yes, sir.

Q. Are you aware of the fact that there is now pending before the French Senate an act submitted to the Chamber of Deputies and by them adopted with substantial unanimity, which act provides that, after a certain time, the manufacture of white lead in France will be absolutely forbidden?

A. I am not aware that a bill has been introduced: I knew there was agitation.

Q. I will ask you to read what I hand you, being the daily Consular and Trade Report, published by the authority of the Bureau of Manufacturers of the United States Department of Commerce and Labor at Washington, D. C., the copy of that publication dated Monday, December 11, 1905, containing a report from Consul General Mason, of Paris on the subject of the poisonous effects of the products of white lead and the legislative act to suppress its manufacture.

450

A. That is, you mean to read the whole article?

Q. Yes, do.

A. (Witness reads same.)

Q. After reading this report of Consul General Mason, are you now aware of the fact that there is this agitation going on in France and that a bill, already adopted by the Chamber of Deputies, is before the Senate Chamber for action?

Mr. WATSON: Objected to as irrelevant and not proper cross-examination.

A. Yes, sir, that is right.

Q. Are you aware of the fact that on January 1st, 1906, there have gone into force in Germany regulations to the effect that white lead may not be rubbed up with liquid vehicles by hand, but only in a mortar from which the escape of dust is impossible?

Mr. WATSON: Same objection.

A. Yes, sir.

Q. That there are also regulations to the effect that coats of lead paint must be kept constantly wet during removal with knives, pumice stone or other mechanical means, and that the resulting paste must be got rid of before dry, so that its removal will cause no dust: that the employer is bound to provide overalls and head
451 coverings to protect the persons applying lead paints from contact with the same, and various other regulations resulting from the poisonous character of white lead?

Mr. WATSON: Same objection as last above.

A. I have seen reference to it, yes, sir.

Q. Are you acquainted with the work of Mr. Thomas Lambert, entitled "Lead and its Compounds?"

A. I am not.

Q. I will read you the following passage from page 123 of that work, which was published in 1902, and ask you whether, from your knowledge as a chemist, you subscribe to it. It reads: "Of all the lead compounds used as white pigments lead sulphate is the only one which is non-poisonous in its action on the system. This property is due to the insolubility of the pigments in the gastric juices of the stomach and consequently it passes away into the bowels without change. On the other hand, all the carbonates, whether made by the precipitation or the Dutch process, are rendered soluble by such action and consequently in this soluble form pass into the blood.

Effects to the working people engaged in this class of work although the Home Office has done much to mitigate the dangers of the work by enforcing stringent regulations in the conduct of white lead factories. Do you subscribe to that?

A. I do.

Q. I will read a passage from the report of Consul General Mason heretofore referred to, as follows: "After many years of more or less desultory agitation and discussion, the protest against the use of white lead as a material for industrial painting has assumed
452 in this country the form and proportions of definite (here quote consular report).

Q. I will ask you Professor Ladd, whether I correctly quoted from the article?

A. I think you have.

Q. Now, sublimed white lead is non-poisonous, is it not?

A. It is.

Q. And zinc lead white is non-poisonous, is it not?

A. It is said to be, yes.

Q. And zinc from western ores is non-poisonous, is it not?

A. Yes, sir.

Q. And lithopone is non-poisonous?

A. I presume it is: I couldn't say, though.

Q. You don't know anything to the contrary?

A. No, sir.

453 Q. As one of the objections to sublimed white lead, you mentioned its tendency to harden in the can. Do you mean to say that that tendency is greater in the case of sublimed white lead than it is in the case of carbonate of lead?

A. I am so informed, yes.

Q. You have made no tests that enables you to say that from your knowledge?

A. We haven't had cans that we could keep long enough to ascertain that.

Q. There is a tendency on the part of carbonate of lead to harden and settle in the can, is there not?

A. Yes, sir.

Q. And that can be overcome can it not, and if overcome?

A. It is, yes, sir.

Q. It is overcome partly by the addition of the zinc white, is it not?

A. It is.

Q. And it may be partially overcome by the addition of some other pigment, can it not?

A. It may, yes, sir.

Q. Now, can you say, Professor Ladd, that the tendency of sublimed white lead to harden in the can is such that in this case this tendency cannot be overcome?

A. I wouldn't say that it could not be overcome: I wouldn't know as to that.

Q. Then, you spoke of another objection to sublimed white lead, consisting in this, that it presents a difficulty of spreading in cold weather. Now, certainly you cannot know that from your own knowledge, Professor?

A. No sir. I didn't mean to convey that impression.

454 Q. Well, who told you that?

A. Well, my conversation with painters and manufacturers of paints, who have experimented or gathered information on the subject.

Q. Which manufacturer told you that?

A. Well, I have been told by several that that was considered one of the objections to it.

—. Name one of them?

A. I think Mr. Blood made it himself.

Q. Did he say that he had found that in his own experience or was it in his case what somebody had reported to him?

A. That I cannot say positively.

Q. Then it may be not only second but third hand information that you have given us on that subject?

A. Yes sir.

Q. Now, who from the Minnesota concern gave you that information?

A. Mr. Ramsey.

Q. And you don't know whether he had made any test himself that lead to that conclusion?

A. No sir, I do not.

Q. Did he tell you that he had made the test himself?

A. No. I don't think he did: that is, I don't think I asked him on that point.

Q. Now, anybody else but those two?

A. I think I have it in statements from some of the other men, but I wouldn't be positive as to which ones.

Q. You could not name any others, could you?

455 A. I think that Senour's man, but I won't be positive, made a similar statement, but I wouldn't want to quote that as being positive.

Q. You didn't find this statement that there is a difficulty of spreading in cold weather with sublimed white lead in any work that you read?

A. No sir, there is very little given on the working qualities.

Q. I didn't ask you whether there was little or much given. I asked you whether you had read that statement in any book?

A. No sir.

Q. Well, so far as you know to the contrary, the same difficulty exists when you spread paint in cold weather which contains—I don't mean the weather but the paint contains other pigments.

A. Yes.

Q. So far as you know to the contrary, carbonate of lead may present a difficulty of spreading in cold weather?

A. Well, some that I used, I wouldn't say didn't. I wouldn't say that that is true of all cases.

Q. Did you spread paint containing carbonate of lead in cold weather?

A. What was bought for that, yes sir.

Q. Did you spread paint purporting to contain carbonate of lead in cold weather?

A. I did, in April.

Q. How cold was the weather?

A. Well, it was the month of April in Northern Maine.

Q. How cold was it?

456 A. Well, it was probably down below zero at nights at times, so that it was cold weather.

Q. Do not manufacturers generally print on their labels an instruction not to use the paint in cold weather?

A. Well, that I couldn't say. It hasn't been on the cans that we have been analyzing.

Q. Can you tell us of any compelling necessity of spreading paint in zero weather?

A. Any necessity for it?

Q. Yes.

A. I don't know as there is any necessity, but if it is cold weather all fall and winter, in the spring it would naturally be colder that it was in the summer.

Q. Would you regard a pigment which otherwise possesses excellent qualities as deserving to be placed under the ban of the state statute because you could not properly spread paint containing it in zero weather?

Mr. WATSON: Objected to as irrelevant and immaterial, not proper cross examination.

A. If that was the only objection, no.

Q. You told us of the Oil Drug and Paint Reporter as being a paper published in New York which you consulted for price lists: is that correct?

A. Yes sir.

Q. And you stated that in that paper you couldn't find any quotation for sublimed white lead?

A. I didn't find it in the copies I had access to.

Q. Are you aware of the fact that the Oil Paint and Drug Reporter is controlled by the Standard Oil Company, which in turn controls the National Lead Company, which in turn hates
457 sublimed white lead as a poison?

A. No sir, I wasn't aware of that.

Q. You tell us that sulphate of lead is recognized as objectionable by some authorities. Please name the authorities.

A. Why, if I understand Mr. Hooker's statement correctly, Mr. Hooker's statement.

Q. Let us get the exact statement of Mr. Hooker that you refer to. Is it a passage in the article on zinkite, which stands for zinc oxide?

A. That is on page 99.

Q. Yes. Now, Mr. Hooker there speaks about the New Jersey zinc oxide, does he not?

A. Yes, sir, first, and then of the western.

Q. Now, read the particular place from which you infer that Mr. Hooker regards lead sulphate as an objectionable ingredient.

A. Speaking here, "a small percentage only of lead sulphate to a leaded zinc containing a high percentage of lead sulphate." That is page 99. He says, "Even a small amount of lead will cause serious trouble to the maker of white rubber, a special selection being required for that particular grade of work. As a painter's pigment, however, the presence of a little lead is of no consequence."

Q. Now, then, Mr. Hooker does not regard the presence of lead as a decided objection when it is present in zinc and when that zinc is to be used in the manufacture of white rubber: is that right?

A. Well, he says as a painter's pigment, though.
Q. Is that right?
A. Yes sir.
Q. He regards it as a decided objection there?
A. Yes.
458 Q. Is white rubber a necessary or proper ingredient of paint or mixed paint?
A. No sir.
Q. Then the objection to the presence of lead sulphate in oxide of zinc when used for the purpose of manufacturing white rubber has nothing to do with the objectionable feature of lead sulphate when the zinc is to be used in paint, has it?
A. No sir.
Q. Now, the sentence, then, from which you infer that Mr. Hooker's opinion is that lead sulphate is objectionable in paint is this, "As a painter's pigment, however, the presence of a little lead is of no consequence?"
A. Yes sir.
Q. Now, have you any other authority for the statement that you made this morning that sulphate of lead is recognized as objectionable by some authorities?
A. That is the only one that I quoted.
Q. Is there any other one that you know?
A. The majority of them have spoken of it as a substitute for white lead but none of them have classed it above it, as far as I recall.
Q. I am asking you whether you can point out any other authority than this sentence from Mr. Hooker's book, which you have interpreted in your own way, and which authorities say that sulphate of lead is an objectionable ingredient in paint?
A. No sir, I don't know as I can, any authorities, without going over the works again.
Q. We have Mr. Hurst's word for the excellent qualities of
459 sulphate of lead, have we not?
A. He says it is as a substitute; he doesn't say it is superior.
Q. I am not speaking of lead sulphate as superior to anything; you have spoken about its being objectionable.
A. Yes sir.
Q. Now I ask you whether we have not Mr. Hurst's word as authority for the proposition that sulphate of lead is valuable as a paint pigment?
A. It is valuable as a paint pigment, yes sir.
Q. And when Mr. Hurst says that sublimed white lead is more permanent than white lead because sulphureous gases and vapors have little or no action upon it, he bases that, does he not, upon the fact that there is sulphate of lead in sublimed lead, rather than carbonate of lead?
A. Yes sir.
Q. Do you know of any reason why the presence of sulphate of lead when found in combination with oxide of zinc in zinc

from western ores is more objectionable than the presence of sulphate of lead in any other combination?

A. Not more than any other combination, no sir.

Q. You have referred both in your testimony and on page 584 of the bulletin to the presence of sulphate in zinc lead white and have referred to it as harmful. What is the sulphate that you had in mind?

A. Zinc sulphate.

Q. Not lead sulphate?

A. Not lead sulphate in that connection, no sir.

Q. Now then, this statement of yours in the testimony this morning is based upon the same source which you gave on
460 page 584 of your bulletin, is it not?

A. In regard to zinc sulphate?

Q. Yes sir.

A. Yes sir.

Q. You got that from G. H. Ellis?

A. Yes.

Q. The language in that bulletin is, "G. H. Ellis, however, reports some analyses of zinc lead white carrying from 1.16 to 5.12 per cent. sulphate," meaning zinc sulphate?

A. Yes sir.

Q. "And considers this constituent in appreciable quantities as decidedly harmful." Where does this statement appear. Where does Mr. Ellis report that?

A. He says, on page 19 of his work, "White Paint Analysis:" while some of the cheaper products contain more or less lead compounds, either as sulphate or oxides and possibly sulphate of zinc. The latter element is considered harmful as it is soluble in water and is liable to cause the paint to 'streak.'" Then, on page 23 he gives analyses of zinc pigments, one of which contains 1.6 per cent., one that contains 1.16 per cent. and another 5.12 per cent. of zinc sulphate. These are the analyses and his reference is back there (indicating in book).

Q. Now this book of Mr. Ellis's from which you have just quoted was copyrighted by him in 1898, was it not?

A. Yes sir.

Q. The analyses which he refers to, therefore, must have been made prior to his copyrighting of this book?

A. Presumably, yes sir.

Q. They could not have been made since?

A. No sir.

Q. Have you any information that would justify you in
461 stating that zinc lead white, as made in the last few years or now, contains any appreciable quantity of zinc sulphate?

A. That I couldn't say.

Q. At the time when this book was published was zinc lead white made by the Cañon City concern which now makes it?

A. Well, that I couldn't say.

Q. Isn't there a small percentage of the zinc sulphate, even in the New Jersey oxide of zinc?

A. It is so quoted in some analyses, yes sir.

Q. Have you ever made an examination of zinc lead white where you found the presence of zinc sulphate in any appreciable quantity?

A. I have not analyzed a sample of the Colorado product, that is, pure product, what I have known to come from there.

Q. Then if it were a fact that the zinc lead white as made nowadays by the Cañon City concern, otherwise known as the United States Smelting Company of Cañon City, Colorado, contains zinc sulphate only in unappreciable quantities, there would be no objection such as you have stated, would there?

A. Not on that particular feature, no sir.

Q. What other objections are there to zinc lead white?

A. Well, from the manufacturers' standpoint, I cannot give you the information.

Q. So far as the manufacturers' standpoint is concerned, you don't know of any objections?

A. No I have not——

Q. Is there any standard that you recognize in the question under consideration than the manufacturers' standard?

462 A. No sir, not in that connection.

Q. You do say in your bulletin that the chief objections made to zinc lead white are that it is not always uniform in composition or in color. So far as the lack of uniformit*h* in composition is concerned, that is based on Ellis's statement, is it not?

A. Largely, yes sir.

Q. What is it based on in addition to the statement of Ellis?

A. Well, the general fact that manufacturers of high grade paints do not seem to be using it to any great extent by the samples that were ex-mined.

Q. Mr. Ladd, let us be frank about one thing: You have only examined so far white- and grays?

A. Whites and grays in general, yes sir.

Q. You have not analyzed or examined the innumerable variety of shades of mixed paints that are not white and gray: is that true?

A. That is true, yes sir.

Q. Then do you regard yourself as competent to testify here under oath as to whether or not the manufacturers of mixed paints used zinc lead white?

A. I stated in the samples which we had analyzed; I wouldn't go outside of that, no.

Q. Now, then, there might be an objection to the use of zinc lead white in white paints and in light gray paints, and there might not be the same objection in other shades of paints: isn't that true?

A. That might be true.

Q. You don't know that there is no zinc lead white used except that you did not conclude that it was present in the samples

463 of whites and grays that you have examined?

A. That is true.

Q. Let us get clear about another point in this connection: In

quite a number of analyses that you made you found sulphate of lead?

A. Yes sir.

Q. You found it in a variety of percentages?

A. Yes sir.

Q. I understood you to say this morning that the presence of lead sulphate may be due either to the use of zinc from western ores carrying in its natural composition lead sulphate?

A. Yes sir.

Q. Or it might be due to the use of sublimed white lead which contains a large amount of lead sulphate?

A. Yes sir.

Q. Or it may be due to the use of zinc lead white?

A. It may be due to the use of those, yes sir.

Q. You have not, up to this time, become acquainted with the methods by which you can determine whether the presence of lead sulphate is due to the one or the other or the third or the pigments which I just mentioned?

A. When present in these small quantities, no.

Q. Exactly. Therefore, for aught you know at the present time, the lead sulphate, in the samples where you found it, might be due to the use of zinc lead white?

A. It might be.

Q. Therefore, are you justified in making any conclusions in regard to the value of zinc lead white from the fact that you have not been able to definitely determine, in the samples that you have analyzed, whether the lead sulphate was due to the presence or use of zinc lead white?

A. From the fact that the zinc lead white contains a much
464 large- proportion of lead *lead* sulphate. I have concluded that the samples analyzed by us were from Mineral Point more largely than from the Cañon City product.

Q. Now then, the Cañon City product contains lead sulphate and oxide of zinc in approximately the same proportions?

A. Yes sir.

Q. About half and half?

A. Yes sir.

Q. Then in sample number 43, on page 596 of the bulletin, where you found 12 per cent. of lead sulphate and 45.75 per cent. of zinc oxide, is it not possible may it not be true, for all you know to the contrary, that there was used 24 per cent. of zinc lead white and 33.75 of zinc oxide?

A. Yes sir.

Q. That may be so?

A. That may be so.

Q. Now, in sample number 40 of which you give the analysis on page 594 of the bulletin, where you say that you found 2.57 per cent. of lead sulphate and 65.81 per cent. of zinc oxide, for anything you know to the contrary might there not have been used 5.14 per cent. of zinc white and 63.24 of zinc exide?

A. Such might have been the case.

Q. You do not say in your bulletin on page 584, that there is an objection to zinc lead white because it is not always uniform in color. Suppose that a batch of zinc lead white were a little off color, were not as white as is desirable in a white pigment, would there be any objection on the strength of the color if that zinc lead white were used in anything but a light shade of paint?

A. Not so far as I know.

Q. Then that objection on the scire of lack of uniformity
465 in color applies only to the white paints?

A. To the light paints, yes sir.

Q. The white paints and the very light paints?

A. Yes sir.

Q. And not to any other?

A. As far as I know it would not.

Q. In what regard does the presence of lead sulphate tend to reduce the efficiency of the paint?

A. That I couldn't say from a practical standpoint.

Q. From what standpoint can you speak about the subject. From the chemical?

A. Selecting the best data, I said, that was available, and from the fact that we did not find that it was used as a substitute in the paints, and from the complaint that the manufacturers that I have already indicated have said in regard to its spreading power and its sett-ing power in the cans, has been the chief reason; and the lack of uniformity in its composition and the presence, as Ellis has said, of the zinc sulphate.

Q. You are again going off into very distant fields, Professor Ladd. I asked you in what respect does the presence of lead sulphate tend to reduce the efficiency of the paint?

A. If it was absolutely pure, I don't know; if it were lead sulphate.

Q. In zinc lead white, do you know anything about the lead sulphate there that would justify you in concluding that it was not absolutely pure lead sulphate?

A. No sir.

Q. In sublimed white lead, is there anything that you know that would justify you in concluding that the lead sulphate in that combination is not absolutely pure lead sulphate?

466 A. That constituent alone? No sir.

Q. Now lead sulphate is always used as a constituent in connection with other ingredients of paint?

A. Yes sir.

Q. What do you mean, then, when you speak of lead sulphate as being absolutely pure or otherwise?

A. I mean these other constituents that are mentioned, zinc sulphate and the other products that occ-r at times in connection with the use——

Q. We are talking about the question whether the presence of lead

sulphate tends to reduce the efficiency of the paint and not about the zinc sulphate.

A. That I could not say.

Q. Then so far as you know, the presence of lead sulphate does not tend to reduce the efficiency of the paint?

A. As far as I know personally, yes sir.

Q. Assuming that the zinc lead white, as now made by the United States Smelting Company, contains only *as* an unappreciable quantity of zinc sulphate, what objection do you know to this pigment other than those that you have mentioned in your bulletin, namely, that is not always uniform in composition or in color?

A. The only objection further than — would be, assuming that it was pure from these other constituents, as you say, that there is not the information which would enable us to judge from what is given of the value of this product in comparison with others.

Q. Mr. Ladd, you have again evaded answering my question. Please let the reporter read the question, it is not necessary that you should repeat the qualification in your answer. That is one thing.

And again I wish to have a direct answer to my question. I
467 am entitled to it, Professor Ladd.

(The question was read.)

A. I know of no objection assuming that it has the same value as the others. I have no objection: I have not accepted that.

Q. I have not asked you to assume that it had any particular value. I have asked you to name the objections to the use of zinc lead white, assuming that, as now produced by the United States Smelting Company, it carries zinc sulphate only in an unappreciable quantity: If you disregard for a moment the objections that you have mentioned in the bulletin, namely, that it is not always uniform in composition or in color, what other objections do you know to its use?

A. Don't know of any.

Q. I understood you to say that all zinc from western ores carries some lead sulphate in its natural composition: is that correct?

A. I have said that I understood that it did.

Q. Now, whether that percentage is five per cent. or ten or fifteen per cent., the lead sulphate if always present as a part of the original state of the ore?

A. The lead is present, yes sir.

Q. Then whatever amount of lead sulphate is present in zinc from western ores is present there, as I understand, as an incident to the manufacture of that pigment because it is carried in the natural composition of the ore?

A. It is, yes sir.

Q. Speaking of lithopone, you made the statement that it lacks uniformity in color. That is due to the fact, is it not that it is manufactured by different processes and by different concerns in different ways?

A. Mainly, yes sir.

Q. Have you found any lack of uniformity in color on
468 lithophone made by the same process and by the same manufacturer?

A. I have not had samples enough to entitle me to pass on that feature.

Q. Do you know anything at all about it?

A. In what respect do you mean, about the variation?

Q. About the variations in color of the lithophone made by the same process and by the same manufacturer?

A. No sir.

Q. Do you know anything about there being any lack of uniformity in composition of lit-ophone made by the same process and by the sume manufacturer?

A. I couldn't say as to that without analysis.

Q. You don't know then?

A. No sir.

Q. Isn't lithophone, at least some of the forms in which it appears in the market, whiter than any other white pigment known?

A. It is said to be.

Q. You don't know at all about that from your knowledge?

A. No sir, I wouldn't say so.

Q. You say it is said to be. 99 per cent. of what you have told us is what you don't know of your own knowledge, but what you have heard from others?

A. Gathered from books and other sources, yes sir.

Q. That is so.

A. Yes sir.

Q. You have stated as another objection to lithophone that it cannot be used in connection with lead. Did you mean that it cannot be used in connection with sulphate of lead?

A. No sir, lead carbonate.

Q. Cannot be used in connection with lead carbonate?

A. Yes sir.

469 Q. Then if lithophone is a good pigment for certain purposes, the fact that it cannot be used in connection with carbonate of lead is just as much an objection to the carbonate as it might be an objection to the lithophone, is it not?

A. Well, each man would be entitled to his own opinion. I differ with you.

Q. You said that lithophone could not satisfactorily be used for repainting over a paint containing carbonate of lead; did I correctly understand you?

A. Yes sir.

Q. And if you spoke of lead, as I believe you did, you mean lead carbonate?

A. I meant lead carbonate; statutory pigments.

Q. There would be no objection on this score if paint containing lithophone other than carbonate of lead?

A. Not so far as I know.

Q. Now, lithophone you said, does not combine with linseed oil

in the same way as carbonate of lead. In other words, it is inert to linseed oil?

A. Presumably so, yes sir.

Q. Will you concede that that is an advantage so far as preventing the possible decomposition, both of the linseed oil and of the lithophone such as occurs when there is a combination between the carbonate of lead and the free acids in linseed oil.

A. Well, there should not be much, if any, free acid in linseed oil.

Q. But don't you know as a matter of fact, that there is very frequently?

A. There might be at times, in some grades of it, but not always.

Q. What linseed oil is used in whites, raw linseed oil or bleached linseed oil?

470 A. Well, I presume that either are used; I couldn't say as to which ones.

Q. Isn't linseed oil to- yellow to be used in whites? I mean raw linseed oil?

A. Yes sir.

Q. Then to produce a very white paint, you have got to use bleached linseed oil, haven't you?

A. Yes sir.

Q. Now, doesn't bleached linseed oil contain a considerable amount of free acids?

A. They say, yes sir.

Q. Is it not bleached by acids?

A. That I couldn't say, whether that is the only process used in that.

Q. If it is a fact that it is bleached by acids, that would lead you, as a chemist, to conclude that there is present in bleached linseed oil quite a proportion of free acids?

A. There might be, yes sir.

Q. In which case the combination with carbonate of lead would be decidedly harmful, would it not?

A. If there was any such free acid, yes sir.

Q. And the fact that there is no such affinity between lithophone and linseed oil of any kind, even the bleached linseed oil, could be to that extent an advantage over carbonate of lead, wouldn't it?

A. If there is free acid, I think there would be with the lithophone with the zinc oxide.

Q. Have you ever known of bleached linseed oil having any decomposing effect upon zinc oxide or vice versa.

A. Well, there would be, if there was free acid present, it might combine with the zinc oxide.

Q. Have you ever made such a test?

A. No sir, I have not. I am only speaking——

471 Q. Have you any authority for such statement?

A. Only so far as chemical action would be expected to take place between free acid and the zinc oxide.

Q. Do you not recognize that lithophone is a complete chemical composition which is practically inert?

A. Well, so far as it is a salt, yes, but so far as it is an oxide, the oxide is in shape to combine with other constituents for which it has an affinity.

Q. In s-ite of its composition would these other constituent ingredients present in lithophone combine with the acid in the oil?

A. In the presence of oil, I should say I would expect it to be acted upon by the acid.

Q. Well, certainly to a less extent that carbonate of lead?

A. Yes sir.

Q. Have you thus far examined or analyzed any enamel paint?

A. No sir, I have not.

Q. I will read to you from the bottom of page 67 and the beginning of page 68 of Hurst's frequently referred to work, where, speaking of Charlton White, which is another name for lithophone, is it not?

A. Yes sir.

Q. He says the following: "Charlton white is an excellent substitute for white lead. Its color is good, its body is superior to that of white lead; in well made samples it has about twice the coloring power, while it possesses the advantages of not being discolored by sulphuretted hydrogen, by sulphur gases or pigments, and of being non-poisonous. It mixed well with all vehibles, so far as it
472 may be used for all kinds of painting with good results. It mixed with all pigments except those having lead or copper as their base; those it is liable to discolor on account of the sulphur it contains, but with any other pigment there is no change produced on mixing." That concurs with your opinion gathered from your general reading on the subject, does it?

A. Yes sir.

Q. I desire to also call your attention to what Mr. George B. Hurst, the same author, says in his later work published in 1902, bearing the title "The Painter's Laboratory Guide." I quote from page 84. "The lithophone whites are excellent pigments. When well made they are of a good white color, are fully equal and in many cases, are superior, to white lead in covering power, while it possesses the advantage of not being discolored by sulphur compounds. It is non-poisonous, it mixes well with almost all other pigments except lead and copper pigments, which are liable to be discolored drom the formation of the sulphides. Being lighter in gravity than the white lead, it does not settle so freely when mixed with oil into paints." Do you subscribe to that from what you know of lithophone?

A. In general, yes sir.

Q. I draw your attention to Page 72 of Hurst's work first quoted from, and particularly to this language: "White lead is liable to change. Zinc (oxide) white, although permanent in color, is expensive, and has comparatively little body. To obtain a moderately priced white, possessing the good qualities of white lead and zinc white, is the object sought for in the preparation of the zinc sulphide

whites: the measure of success may be gauged by the fact
473 that the production at the present time is 100 tons per week and is steadily increasing." This refers to the various kinds of lithophone, does it not?

A. Yes sir.

Q. And you have no fault to find with this statement of the author, have you?

A. I know nothing about its working in the paint itself.

Q. That is because you have made no practical tests?

A. Yes sir.

Q. Coming now to bar-tes. I will call your attention to page 77 of Hurst's work, where he says under the head of "Properties and Composition of Bar*tyes*"—I read beginning with the fourth line: "It is quite unsoluble in all acids and alkalies, a property, or rather properties, which distinguish it from other *q*hite pigments. It is quite unaffected by any injurious influences such as affect white lead, and, therefore, as a pigment it is the most permanent white known. For this reason it has been called and sold as constant white, permanent white, etc. In bory or covering power it is much inferior to either white lead or china clay, but it is better than zinc white. It mizes very well with white oil, of which it takes about 7 per cent. to grind into a stiff paste. As an oil paint it is satisfactory to use, but for water colors it is not so good, seeming to loose some of its body on mixing with water." Did I correctly quote Mr. Hurst?

A. You did in the parts read.

Q. I will ask you Professor Ladd, to look at page 86 of Hurst's Laboratory Guide and state whether I correctly quote him there: "Blanc fixe is an excellent pigment for it has good covering powers
474 and, what is better, is quite permanent in every respect, a property in which it is second to none."

A. Yes sir.

Q. Did I correctly quote the author?

A. You did.

Q. Is it correct that paint has two important uses, one to protect structures from the destructive *affects* of the weather and *second* to decorate them?

A. Yes sir.

Q. Do you know of any other use *fir* which paint is applied to surfaces?

A. That is the purpose for which it is applies.

Q. Is capacity a quality *that* by saying "not necessary"? Has it anything to do with the protective features of the paint?

A. No, I don't think it has.

Q. Which do you regard as the most important function of paint, to beautify or to protect?

A. Well, we consider both as essential for the greatest satisfaction, but, so far as the property is concerned, the protection.

Q. The protection would be regarded by you as the more important quality, would it not?

A. In most cases, yes.

Q. When it comes to the question of protection or a surface from the influences of atmospheric conditions or water or mechanical contact, is not the quality of indestructibility of a pigment of great importance?

A. Yes sir.

Q. State from your knowledge as a chemist—I ask for that, as you appear to have no knowledge whatsoever from a practical point of view—whether inert pigments do not possess the quality of indestructibility to a greater degree than those pigments which are not inert?

A. Yes sir, of indestructibility.

475 Q. If the sole purpose, therefore, were to protect the surfaces and if the question of beautifying and hiding were not sought to be attained, then you would regard the inert pigments as the most excellent, would you not?

A. They would serve to protect, yes, providing there were linseed oil to hold them in place.

Q. Now, so far as Barytes is concerned, Mr. Hurst says that it mixes well with linseed oil. Do you agree with that statement or have you anything from which to form an opinion that that statement of Mr. Hurst is not true?

A. Mr. Hurst, well, I just say that the authorities do not fully agree in regard to their statements about these different pigments.

Q. And do you know which is correct in his opinion?

A. Well, I couldn't say from experience or from experiments.

Q. And how about silica?

A. It would be similar to barytes.

Q. How about silicate of magnesia?

A. It would be similar.

Q. I call your attention to what Sabin says in his work on the Technology of Paint and Varnish, on page 119: "It is not the purpose of the writer to go into any elaborate account or the various pigments because there are nor books devoted to that subject which treat it more fully and with greater knowledge than he can." Do I correctly quote him?

A. Yes.

Q. Would you not judge from that that Sabin does not desire to get himself up as an authority on the question of the pigments and the manner in which they work?

A. Yes. I would infer from this that he has stated that there are other works that go into the subject more elaborately

476 than he does, yet he has expressed his views.

Q. But doesn't he also state that there are others who can speak with more authority on the subject than he can?

A. He has stated so, yes.

Q. I will ask you to observe what Hurst, in the "Painter's Laboratory Guide" says on page 2: "The pigments to which, as just stated, paint owes its substance and color must be bodies which are not subject to chemical alteration when exposed to the weather. In order to possess this feature, it is found that they must be insoluble in water. Such substance, for instance, as sugar, sulphate of copper,

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bichromate of potash or nitrate of cobelt, all of which are soluble in water, are found to be quite worthless as pigments for painting. Experience has shown that there is nothing better than such natural products as barytes, ochre, umber, Indian red, whiting, China clay, gypsum or such artificial preparations as white lead, zinc oxide, ultra-marine, chromo yellow, etc., for preparing paints from, and these are very largely used for the purpose." Did I correctly quote the author?

A. Yes sir.

Q. I will further read while you follow me, from page 3 or the same book: "In painting, the desire is to hide the original surface and to show only the paint. The application of the oil and turpentine, while forming a protective film, will not do this because the cost of oil that is left is transparent and so the surface is seen through it.

477 It is therefore necessary to mix the oil with an opaque substance in order to hide the surface which is being painted, and this is one of the factions of pigments used in paints. It is found that many pigments like Prussian blue and crimson lake, for example, possesses strong coloring powers but, as they are not sufficiently opaque to be employed alone, they must be used with some other pigment which possesses the needful opacity. We find, therefore, that pigments may be divided in two groups, 'body' colors and 'staining' colors, as they are called. White lead and barytes are very largely used as body colors, for they are very opaque, while chrome green and crimson lake are samples of staining colors to which the color or the paint may be due. Some pigments, like ochre, umber, red oxide and Brunswick green, possess sufficient opacity to enable them to act both as body and staining colors at the same time." Did I quote the author correctly?

A. Yes. sir.

Q. I will ask you Professor Ladd, to follow me while I read from page 5 of the same work: "There is much yet in the paint trade that is obscure and needs some research work to illustrate and make clear." And, again, "A thorough knowledge of the chemistry of pigments and paint materials is not to be gained by simply reading about them in text books, however, good these latter may be, but by working them and experimenting with them under all sorts of conditions and circumstances."

A. Yes sir.

Q. Did I correctly quote the author?

A. Yes sir.

Q. You understand Professor Ladd, that Freemen's non-poisonous white lead, of which we have heretofore spoken and regard-

478 ing which we have quoted Professor Hurst's work, is a mixture of sulphate of lead and zinc white, made by grinding the two pigments together for some time?

A. Yes sir.

Q. Now, on the other hand, zinc lead white is produced by a furnace process in which sulphate of lead and zinc white are reduced in combination?

A. Yes sir.

Q. From *know* knowledge as a chemist, would you say that the properties of Freeman's and the properties of zinc lead white would be about the same?

A. Well, that I couldn't say.

Q. In other words, your knowledge as a chemist would not enable you to form any judgment on it?

A. It appears from the claims that have been made——

Q. In other words, your knowledge as a chemist would not enable you to form any judgment on it?

A. It appears from the claims that have been made——

Q. I am not speaking of the claims that have been made, Professor Ladd. I have distinctly asked you for your judgment, based upon your chemical knowledge.

A. If they were differently united substances, I see no reason why they should not.

Q. Can you, as a chemist, say that the result would be different, whether it is produced by grinding the two pigments together or by bringing their combination about through a furnace process?

A. I should expect there might be some difference in the physical properties of the two.

Q. Would that suspicion in your mind arise from your knowledge as a chemist?

A. Yes sir.

Q. And what would be that difference?

A. I should expect that, in the case of the furnace work, they would be more intimately united together, blended together.

479 Q. And you would regard that as an advantage?

A. That I am not prepared to say; that couldn't be told except by physical experiments, I should say.

Q. Then, apart from the close unity brought about by the furnace process, you would not know of any difference between the two?

A. Personally, I don't, no sir.

Q. I understood you to say that the opacity of carbonate of lead is very great: is that correct?

A. It is.

Q. How about the opacity of zinc white?

A. That is great also.

Q. Have you any knowledge of your own that would enable you to say that the addition of, say, not exceeding 30 per cent. of barytes to a combination of carbonate of lead and oxide of zinc would detract from the desirable degree of opacity of the paint?

A. Well, from my chemical knowledge, I should say——

Q. I am ta-king aboyt opacity.

A. Well, I meant that too. Since the barytes and the zinc form a transparent body, I would not expect the same degree of opacity as I would if that body was not present.

Q. I have asked you whether you have any knowledge that would enable you to say that the presence of barytes in the preparation named would detract from the desirable degree of opacity.

A. I have stated that from my chemical knowledge, it is crystal, ground up stone, barytes, I would expect it. If you ask if I have had

any practical knowledge I should say no.

Q. Do you expect that Mr. Hurst has some knowledge on the subject of chemistry affecting the question?

A. I do.

480 Q. And you are aware of the fact that he regards barytes as quite an opaque pigment?

A. Yes sir.

Q. And still you maintain that the presence of thirty per cent. of barytes mixed with, say thirty-five per cent. of carbonate of lead and thirty-five per cent. of oxide of zinc, would detract from the desirable degree of opacity?

A. I should expect it to detract from the product which was made from zinc oxide and lead carbonate alone. Another containing that I should expect to have less *ca*pacity.

Q. So would I, Professor Ladd, but I ask you whether it would reduce the opacity below the desirable degree.

A. Well, that I couldn't say.

Q. You have no knowledge on that subject?

A. Below a desirable degree?

Q. Yes sir. You have no knowledge now on that subject?

A. No sir.

Q. No judgment on it to express?

A. My judgment is, as I have stated, that I believe it would.

Q. That it would reduce the opacity below a desirable degree?

A. That is, that it reduced the opacity.

Q. I stated already that I agreed with you on that, but I ask you whether you have any judgment on the question as to whether the presence of barytes would reduce the opacity below a desirable opacity.

A. Well, that I couldn't say.

Q. Assuming that it would not reduce the opacity below a

481 desirable degree of opacity, then would not the fact that it is so much more indestructible than carbonate of lead add to the durability of the paint?

A. There are other objectionable features.

Q. I ask you whether it would not add to the durability of the paint?

A. I cannot answer that without bringing in the other features in connection with it. In my own judgment, no, if you want the answer that way.

Q. And why?

—. Because of the other objectionable features.

Q. Which are?

A. Which are that, it being a crystalline body, it tends to run down in the paint, and it add- nothing to the value of the lead and zinc and the oil and for that reason I wouldn't consider that it was the equal of it.

Q. How about its great permanency emphasized so strongly by Professor Hurst?

A. I question whether it is more permanent than the lead and zinc with pure oil.

Q. Then you question the correctness of Professor Hurst's statement.

A. If you put it in that form, yes sir.

Q. But I understand from you that you have absolutely not a single practical test upon which to base any such judgment.

A. That is what I stated, yes sir.

Q. You are simply theorizing upon the subject.

A. From the chemistry of the subject, yes sir.

Q. And you are doing that which Professor Hurst warns against in the passage which I last read from him, namely, basing conclusions upon book reading, without practical tests and experiments?

A. Yes sir.

—. Now, barytes is the heaviest of the Class B pigments, is
482 is not?

A. Yes sir.

Q. Silica is much lighter in specific gravity?

A. Yes sir, in paint when used as a pigment. *A.* Being lighter, it would not have the same tendency, no sir.

Q. It would not have the same tendency?

A. I would not expect it to have the same tendency.

Q. Do you have any judgment as to whether it has any such tendency?

—. My observation of crystalline silica would lead me to believe that it would have the same tendency in that direction the same as crystalline lead.

Q. You mean your observation from tests?

A. From silica itself.

Q. Silica itself, but not from silica when used as an ingredient of mixed paints?

A. Not in mixed paints.

Q. Silica being so much lighter than carbonate of lead, its tendency to run and sag would be very much less than that of corbonate of lead, would it not?

A. Except that it does not combine with the oil and therefore would not be held in place to any extent the same as lead would be held.

Q. Doesn't it take three times as much linseed oil as white lead?

A. Well, I couldn't say as to the figures. No, not exactly. It takes more.

Q. Don't you know that it takes more linseed oil than white lead?

A. Yes sir.

Q. Then it combines with linseed oil, doesn't it?

A. Not chemically.

483 Q. Is the chemical combination an advantage in your eyes?

A. It is.

Q. Do you know that most chemists, and the best informed chemists, regard it as a disadvantage?

A. I do not.

Q. Do you mean to say that chemical combination is required in order to precent pigments from settling or sagging or running?

A. No sir, I said it would have that tendency.

Q. You are again only theorizing on the subject, are you not, Professsor?

—. No sir, I am not in this case.

Q. Have you made any experiments with mixed paints containing silica, wherein you found that the silica shows a tendency to run or sag or settle?

A. I have stated that I have not.

Q. Then I say you w-re merely theorizing on the subject: is that true.

A. From chemical knowledge, yes sir.

Q. Your chemical knowledge is a theory, is it not?

A. No sir, I don't consider chemical knowledge theory.

Q. Your chemical knowledge simply leads you to have an opinion as to what is likely to be the tendency of silica in that regard, isn't that all?

A. I know it will not chemically combine with it.

Q. But the opinion which you have expressed, that, by virtue of its failure to combine chemically with linseed oil it will have a tendency to run or sag or settle, is only a theory derived from your knowledge of the fact that silica does not combine chemically with linseed oil?

A. It is to a large measure, yes.

Q. Take now, a paint consisting of 42½ per cent. of zinc oxide and 42½ of carbonate of lead and 5 per cent. of calcium
484 carbonate and 10 per cent. of silicate of magnesia. Would there be, in the first place, a reduction of the opacity below the desirably degree?

A. I don't know that there would be.

Q. Wouldn't the presence of the 10 per cent. of silicate of magnesia and the five per cent. of calcium carbonate add to the durability of the paint?

A. In my judgment I don't see where it would.

Q. You don't know where it would?

A. No.

Q. That is probably because you don't know enough about it, is not that so?

A. That may be.

Q. Wouldn't the pigment remain in suspension much better than without the addition of the silicate of magnesia?

A. I should say that it would, yes sir.

Q. Let us understand each other in regard to adulteration. Now anything that goes into paint, if it is clearly stated on the label, would not, of course, be adulterated, would it?

A. No sir.

Q. The question of adulteration can only arise where the contents of the package are not known in advance?

A. Yes sir.

Q. Assume that pigment has, up to a certain percentage, a useful purpose in the paint—to use an illustration, five per cent. of the calcium carbonate—would you call that an adulteration?

A. It would depend upon how it would be sold.

Q. I am speaking of anything but the paint itself. Anybody who would speak of a can of paint containing zinc white *white* lead and calcium carbonate as containing no other pigments than carbonate of lead and oxide of zinc is an abominable fraud, an
485 adulterator and any other hard name that you may think of.

We agree to that. I am not speaking of making a fraudulent representation. I am speaking about a paint regarding which no representation whatever is made. If it contains any pigment up to a percentage to which it adds a useful quality to the paint, no matter what it is, you would not call it an adulterant, would you?

A. If it is wholly a useful product.

Q. That was implied in my question, Professor Ladd. It is not necessary for you to always respect the qualifications when I have already made the qualifications in my question. Now, then, if of a useful article more is put into the paint than is proper to serve a useful purpose, then it is an adulterant, is it not?

A. If it proves by its presence harmful, I should say yes.

Q. If it does not serve any useful purpose, then how can it be other than harmful, adding bulk and weight and adding no useful quality: could it be anything but an adulterant?

A. No sir.

Q. Very well, we agree, do we?

A. Yes sir.

Q. Then do I understand you correctly as meaning that the adulteration begins at the point where the proper percentage of a pigment is exceeded, where there is an excess of the percentage of a pigment beyond that which serves a useful purpose?

A. If it has no value, adds no value, yes.

Q. Then excess beyond the percentage which serves a useful purpose certainly has no value, has it?

A. No, it has no value if it is beyond the percentage, no sir.

Q. If a mixed paint manufacturer would put into his
486 mixed paint can more linseed oil than is necessary to give the proper degree of consistency, that excess would be an adulteration, would it not?

A. I would consider it so, yes sir.

Q. You would be aided in that determination by the fact that linseed oil in mixed paint which is sold by the bulk and not by weight, is cheaper, measured in bulk than carbonate of lead or oxide of zinc?

A. Yes sir.

Q. Now, I understood you to say this morning that the proper combination between carbonate of lead and oxide of zinc is in equal percentages, or, rather, you said one third of oxide of zinc and two thirds of carbonate of lead would be the ideal combination in most cases, but that, under some circumstances, you would allow as much as fifty per cent. of oxide; did I correctly understand you?

A. No, I don't think I stated that. If you will allow me to state, I think I said, when I was asked what I would consider, I said I would select myself one third of zinc to two thirds of white lead,

but in the majority of the better classes of paints which we had examined, they were nearer equal parts. That is in substance my statement.

Q. Now, is your opinion about one third of zinc and two thirds of lead being the best combination based upon what Sabin days on the subject.

A. No sir.

Q. You are aware of the fact that he says that two thirds of lead and one third of zinc gives the best results?

A. I saw the statement, yes sir.

Q. Now, up to what degree, up to what percentage would you think the addition of zinc to carbonate of lead is serving a
487 useful purpose?

A. You mean for exterior whites or for all paints?

Q. Take exterior whites, first.

A. Well, I should say that very much above one half of zinc oxide would detract from its value, in my judgment.

Q. Well, and it being considerably cheaper than carbonate of lead, it would in that case be an adulterant, would it not?

A. It would be added probably for the purpose of cheapening the paint.

Q. And therefore you would call it an adulteration?

A. In my mind, yes sir.

Q. Well, wouldn't you so express it also?

A. I certainly should.

Q. Then it is not only in your mind?

A. I didn't mean to express it as legal.

Q. You stated that, as far as you have observed, in the state of North Dakota seventy per cent. of the buildings were painted either white or gray. Did I correctly understand you?

A. That is correct, yes sir.

Q. This observation of yours, I suppose was made while travelling through the various counties in an official capacity?

A. Yes sir.

Q. Did you have an opportunity to observe the inside of the buildings to the same extent that you did the outside?

A. Not to the same extent, no sir.

Q. Well, can you give us an idea of the comparison between the amount of observation that you have had as to the outside
488 of buildings and the amount of observation that you have had an opportunity to make — the inside of buildings? How do the two compare?

A. Of the actual paints of the houses that I have been in, I should say that——

Q. I am not speaking of the colors that are used on the inside. I am asking you, if you have seen ten times as much of the outside of buildings as you have of the inside of buildings?

A. Yes more than that.

Q. Have you not seen fifty times as much of the outside of buildings as you have of the inside of buildings?

A. I probably have.

Q. Maybe even more times?
A. Possibly more than that.
Q. So that your observation of the paints used on the inside of buildings in North Dakota is very limited, of course?
A. As would be the case of any man who is not making an inspection of the buildings, the interior, for that purpose, yes sir.
Q. Now, how do the farmers in North Dakota use paint to paint out buildings?
A. The larger portion of their buildings are grays and browns in North Dakota on the out buildings.
Q. Do they use dark browns and reds?
A. To some extent, but not very much of reds in that state.
Q. How about the barns?
A. Well, that is what I have referred to principally.
Q. How about the fences?
A. Well, we don't have fences in North Dakota.
Q. You said you subscribed to the statement of Professor Hurst that carbonate of lead and ultramarine cannot be used together?
489 A. I said that was probably true.
Q. As a chemist, you would say that that is true?
A. I should expect it to be true.
Q. And that results from the fact that ultramarine contains what element?
A. The sulphur.
Q. What is the effect of the combination?
A. To form a sulphide with the lead.
Q. What is the effect of that upon the color?
A. It would change the color.
Q. Now, in those mixed paints in which the desired variety of blue can only be obtained by the use of ultramarine carbonate of lead would be barred, would it not for practical purposes?
A. Practical purposes, yes sir.
Q. Then when other statutory pigments would be left? Only oxide of zinc; isn't that so.
A. Either that or to label, yes sir.
Q. Well, I am not speaking of the label now.
A. Yes.
Q. There would then be left only oxide of zinc?
A. Yes sir.
Q. From your knowledge of the properties of oxide of zinc alone, in connection with ultramarine as a coloring matter, could you obtain a satisfactory paint?
A. Probably not entirely satisfactory.
Q. Then, in order to give the proper body and other qualities which mixed paint should have, it would be necessary to add some other pigment?
A. It would.
Q. And one that would not combine with the sulphur of the ultramarine?
A. Such would be the case.

Q. What pigment would you then use in that case?

490 A. I don't know which would be the most satisfactory.

Q. But one or another of the Class A pigments, or possibly combination of the Class A and A pigments?

A. Class A and B pigments, yes sir.

Q. Now, then, let us for a moment speak of the concentrated colors such as the red vermillion dyes and the chrome greens. Take the shade marked vermillion on the color card heretofore introduced in evidence. Do you recognize that as being made of red vermillion dye?

A. I presume that it is, yes.

Q. Now, if you want to produce this very color, can you produce it by using merely the red vermillion dye?

A. I might not be able to produce that shade, probably not.

Q. Wouldn't it be merely a stain instead of a paint?

A. Using the statutory pigments, you mean?

Q. No. I am speaking about using no pigments except the red vermillion dye with linseed oil.

A. Certainly, if you used the red dye, yes.

Q. It would be merely a stain?

A. Yes.

Q. You have got to have some white pigment?

A. Yes.

Q. Could you use any of the statutory pigments without modifying the color?

A. Probably not without modifying the color.

Q. You again put in that qualification into the answer when I have already made the qualification in my question. The more of the statutory pigments you would put into the paint with this red vermillion dye, the lighter would become the shade; wouldn't that be so?

A. Yes.

Q. And that is by reason of the great coloring strength of

491 the statutory pigments?

A. Yes, sir.

Q. Woudn't the same thing be true of the Class A pigments by reason of their large coloring power?

A. Yes.

Q. Then, in order to give body to the paint, would it not be absolutely necessary to use Class B pigments, if you desire to produce a mixed paint with this shade of vermillion?

A. If you used vermillion dye, yes sir.

Q. What other dye or color could you use to produce this shade that I point out to you and which is marked on this color card in evidence as vermillion?

A. I am not familiar enough with the manufacture of paint so that I would care to give evidence on that point.

Q. Then you don't know?

A. On that point, no, sir.

Q. Then I will not ask you in particular about these various other colors produced by the use of the red vermillion dyes and the chrome

greens, but will ask you generally, this question: Suppose a coloring matter which has not in itself the necessary body to give the proper consistency to mixed paint, and suppose that you want to produce the original shade that is given by the use of that color without any modification: could you in such a case use either class A or the statutory pigments to produce mixed paint?

A. Not if using that dye, no.

Q. I have already had that in my question. Then your answer is no, is it?

A. Yes, sir.

Q. If you can use neither the statutory or the Class A pigments, is it not absolutely necessary that you should use Class B pigments in such cases?

A. I presume it is.

492 Q. Have you ever come across white mineral primer?

A. I have never examined it.

Q. Do you know its properties?

A. No, not from my own experience.

Q. What authority have you consulted in regard to white mineral primer? Any?

A. I couldn't say that I have examined any especially for that one product alone.

Q. Can you say that the calcium carbonate which you found in some of the samples analyzed by you was not white mineral primer?

A. No, not in some of these I couldn't say that it was not.

Q. In sample 42 could you say that the calcium carbonate was not white mineral primer?

A. No, I don't know as I could say that it was not; it was calcium carbonate.

Q. That is all you know. You know the chemical formula for the pigment that you there found, but you could not distinguish its physical properties from other calcium carbonate, could you?

A. We have not as yet, no sir.

Q. And you have not as yet perfected your methods of testing to such an extent that you could distinguish between the various kinds of calcium carbonate?

A. Between some of the kinds you cannot. With others, microscopically I think you can.

Q. For the present you have not gone so far with your tests?

A. I have not.

Q. You are not making microscopical tests, are you?

A. Yes, sir, some.

Q. Well, I mean in respect to the distinction between white mineral primer and other forms of calcium carbonate?

493 A. Not that particular one, no, sir.

Q. As you do not know white mineral primer, your condemnation of calcium carbonate in your bulletin would not necessarily apply to white mineral primer, would it?

A. Well, it is still calcium carbonate.

Q. Yes, but you have never examined white mineral primer?

A. Not for special study, no, sir.

Q. Therefore your condemnation does not necessarily apply to white mineral primer, does it?

A. Well, it applies to calcium carbonate of which that is one.

Q. But your condemnation of calcium carbonate was based upon what knowledge you had or information, rather, you had obtained regarding various other forms of calcium carbonate and not white mineral primer?

A. Not a special study of that product, yes, sir.

Q. Why do you say, "not a special study?" Was there any study of white mineral primer that you have made?

A. No, only in so far as it may have been contained in the paints which we examined.

Q. You didn't examine its physical properties?

A. No, sir.

Q. You didn't make a test as to its wearing qualities?

A. No, sir.

Q. You have made no study as to white mineral primer and its qualities?

A. No, sir.

Q. Did you ever see it in its original form?

A. Not unground; we have a sample ground.

Q. You have samples of white mineral primer unground?

A. No, I say I have never seen it unground, but we have a
494 sample of it in ground form.

Q. It is not true that two articles may have exactly the same chemical composition and be absolutely and totally different in physical properties?

A. Yes, sir.

Q. That is true?

A. Yes, sir.

Q. And a common illustration of that would be that of a diamond and a piece of pure coal, which would both be pure carbon?

A. Well, nearly pure carbon, yes, in the case of the diamond.

Q. And so the physical properties of various kinds of calcium carbonate might, for all you know to the contrary, be vastly different?

A. They might be different, yes, sir.

At this point further proceedings were adjourned until Tuesday morning, February 6, 1906, at 9 o'clock.

495 TUESDAY, *February* 6, 1906—9.00 a. m.

E. F. LADD, Recalled.

Cross-examination resumed by Mr. ZEISLER:

Q. Professor Ladd, in a speech made by you before the State Hardware Association at Grand Forks, North Dakota, on January 30th of this year, did you not state that, for aught you know, a combination between Class A pigments and Class B pigments may have merit and may be equal, for aught you know, to white lead and zinc

oxide paint in its working qualities, though its chemical qualities, are entirely different from those of white lead?

A. I did.

Q. Now, is there a chemical combination formed between linseed oil and commercial bright oxide of iron?

A. I couldn't say that there is.

Q. Now, commercial bright oxide of iron consists of approximately 37 per cent. of oxide of iron and 63 per cent. of sulphate of lime, does it not?

A. Well, its corporations may vary, but it might be, as given by some authorities, 50 per cent. of each, but analysis will show light variations in its commercial product.

Q. What do you know about the qualities of a paint made of commercial bright oxide of iron, of course, in combination with linseed oil and whatever other vehicles may be proper?

A. I have made no experiment with those.

Q. For aught you know to the contrary, that makes an excellent paint?

A. I have had no experience with it.

Q. For aught you know to the contrary that combination
496 would make an excellent paint, would it not?

A. I wouldn't consider it so forming a paint of the same character as the white lead.

Q. Can you use white lead when you desire to produce a red color such as requires the use of commercial bright oxide of iron?

A. Probably not, no, sir.

Q. Then you cannot make a comparison between those two, can you?

A. That is what I say: they are two different groups.

Q. You, however, know nothing about the working quality of such a paint made of commercial bright oxide of iron?

A. No, sir, I do not.

Q. What I mean by working quality is, you don't know that any part or the pigment either sags or runs?

A. I do not.

Q. Do you know about the durability of such a paint as I have just spoken of?

A. No, not personally I don't.

Q. Haven't you learned from the opinoin of others that such a paint will last twenty years?

A. No, I have not learned that because I have not made any special study of that particular line.

Q. Have you made any study of that particular line?

A. No, sir. not any particular study.

Q. Have you made any study?

A. I have made no chemical study of the product at all.

Q. Have you made any study of its practical working?

A. No, sir, I stated that.

Q. Then you haven't made either a chemical or practical study of it?

A. No, sir.

Q. Then I come back to my question: you haven't made any study of it?

A. Only so far as the incidental reading: no study outside
497 of that.

Q. You haven't made any study of the working qualities of white lead paint, have you?

A. Only so far as I have used it and seen it used.

Q. Only so far as you have used paint said to contain carbonate of lead on your house?

A. Yes, sir.

Q. Now, is there any combination formed between yellow ochre and linseed oil?

A. Probably not.

Q. Now, yellow ochre contains about twenty per cent. of hydrated oxide of iron and the remaining ingredients are clay and silica; isn't that true?

A. Yes, sir.

Q. Do you know whether there is any sagging or running in a paint made of yellow ochre?

A. I couldn't say, no, sir.

Q. You know that both commercial bright oxide or iron and yellow ochre are among the most frequently used colored pigments, do you not?

A. I think they are, yes sir. Outside of the grays, outside of the lights: I should want to put that in at the same time.

Q. Again you insist upon putting in the modification which is already contained in my question, because my question spoke of colored pigments.

A. Well, I would call the gray colored too.

Q. Bone black is one of the pigments very frequently and largely used, is it not?

A. Yes, sir.

Q. Is there any chemical combination between bone black and linseed oil?

A. Not so far as I know.

Q. Doesn't bone black consist of about fifteen per cent. of carbon, the balance being chiefly carbonate of line and phosphate
498 of lime?

A. Yes, sir.

Q. Is graphite one of the colored pigments very largely used in the making of mixed paints?

A. In certain classes of mixed paints, yes, sir.

Q. Graphite consists of approximately fifty per cent. of graphitic carbon, the balance consisting chiefly of silica and silicates; isn't that so?

A. The way the product is used I couldn't say. I didn't think that to be the exact proportions, but I wouldn't say.

Q. You know that it contains a large percentage of silica and silicates, do you not?

A. It contains, according to its ourity, varying quantities: I couldn't say the amount.

Q. Now, can you tell us the composition of siennas?
A. No, sir, I couldn't give the——
Q. Don't all siennas contain a large amount of silica and silicates and clay?
A. They probably do, yes, sir.
Q. Is there any chemical combination between siennas and linseed oil?
A. That I couldn't say.
Q. Is there any chemical combination between siennas and linseed oil?
A. That I couldn't say.
Q. Are not siennas very largely used among colored pigments used in mixed paints.
A. That I couldn't say.
Q. Are not siennas very largely used among colored pigments used in mixed paints.
A. They are.
Q. Now, have you ever heard the objection raised to any of these colored pigments that I have mentioned this morning, based upon the ground that they do not form chemical combinations with the linseed oil?
A. I have made no study: I couldn't say that I have.
Q. Does this lack of information on your part arise from the fact that thus far you have given attention mostly to the
499 composition of white and grey paints?
A. That is as far as our studies have been pushed in any systematic way.
Q. Then you would say yes to my question?
A. Yes, sir.
Q. Have you seen red paints on barns in North Dakota?
A. Occasionally, yes, sir.
Q. A red paint is desired and expected to last longer than a white paint, is it not?
A. It is usually worn longer on the barns without repainting.
Q. And such paints as are made from the various colored pigments that I have mentioned are all expected to last longer than a white paint?
A. Yes, sir.
Q. Now do you not know that the paints made from these colored pigments last longer than white paints?
A. Why, not always.
Q. Do they not sometimes last as long as fifteen or twenty years.
A. They may.
Q. I suppose you are aware of the fact, Professor, that white lead prepared by what is commonly called the Dutch process contains a considerable proportion of coarse particles which are commonly spoken of as sandy lead?
A. To some extent, yes, sir.
Q. Do you not know, Professor, that these particles cause sagging and running when such white lead is thinned down with a slight excess of linseed oil?

A. I should expect them to.

Q. Well, you regard the Dutch process the best?

A. I do.

Q. That means, of course, the best process of making white lead?

A. The best process of making pure white lead, yes, sir.

Q. And when you speak of pure white lead, you mean the commercial carbonate of lead?

A. Yes, sir.

500 Q. Containing approximately two thirds of carbonate of lead and one third of hydrated lead?

A. In that vicinity, yes sir.

Q. If the presence of a large percentage of silica, silicates, clay, etc., in combination with oxide of iron and other chemicals, in the various colored pigments that I have mentioned causes no unsatisfactory result, can you assign a reason why the presence of silica or silicate of magnesia should cause an unsatisfactory condition in white paint, provided that the percentage added is not so large as to detract from the desirably degree of opacity?

A. I should not expect as good results by the addition of any of those products in the crysralline form to the lead as I would in the absence of them, and I would not exp-ct as good a finish from these other paints, barn paints, as I would from the leads that they put upon the house.

Q. The fact that these inert materials are much more permanent than white lead and zinc white and therefore do not chalk or flour or chip off, weights nothing in your mind, does it?

A. Yes sir, for the purpose for which they are intended.

Q. Then that is an element in their favor, is it not?

A. So far as wearing, that part of it, yes sir.

Q. My question implied that, Professor; I spoke of their permanent and of their adding to the durability of the paint.

A. That one feature, yes sir.

Q. Your objection to these inert pigments that we have mentioned arises then, as I understand, from the fact that they are of a crystallin physical condition?

A. Not wholly.

Q. But you emphasized that, didn't you?

501 A. I mentioned that as one, yes sir.

Q. Well, let us speak of that objection, the objection that they are of crystalline form. You know that a number of forms of white lead are crystalline?

A. No sir, as we usually get it, it is not in crystalline form.

Q. Have you ever seen it in any other form where it was crystalline?

A. Not the clay, no sir.

Q. Very well, they you do not know of its being crystalline at any time?

A. No sir.

Q. And the word "usually" in your answer was entirely superfluous, was it not?

A. Well, I wouldn't say that it never does occur in that form——

Q. And the word in your answer was entirely superfluous was it not?

A. Well, I wouldn't say that it never does occur in that form——

Q. You say "in the form in which we usually get it."

A. Yes sir.

Q. You have never gotten it in any other form?

A. No sir, I have never looked for it.

Q. But you never have seen it in any other form.

A. No sir, I have never looked for it.

Q. Then the word usually is entirely superfluous?

A. Not in my judgment.

Q. Now then, this objection on the score of crystalline form being disposed of, what objection is there to the use of silicate of magnesia or silica?

A. It is used as an adulterant to cheapen the product.

Q. Mr. Ladd, we have already talked about the question of cheapening.

A. Yes.

502 Q. You have admitted yesterday that oxide of zinc may be used for the purpose of cheapening. I am not speaking of the cost of an article but of its objection from the standpoint of its adding usefulness to the paint or adding no usefulness to the paint or detracting from the useful qualities of the paint. These are the matters that I wish to draw your attention to.

A. Yes sir.

Q. Now, what other objection is there to these pigments that I have just mentioned than their crystalline form?

A. They are not to be compared with the lead, as I have stated before, that they do not contain a constituent to combine with the oil to form resinous or varnish like body which gives elasticity and toughness to the paint.

Q. When you say they don't compare with white lead, what kind of an objection is that?

A. Because that has been called the statutory pigment, to which I have compared all the others as a standard.

Q. The statute has made that a statutory pigment. We are speaking of three various pigments irrespective to North Dakota statute.

A. Yes sir.

Q. We are investigating the question whether your North Dakota statute is based upon proper and reasonable distinctions. Therefore do not make your comparison with the carbonate of lead because it has been sanctified by the North Dakota statute.

A. No sir, I am not.

Q. Very well. That it does not compare with the carbonate of lead is in itself no objection, unless you can point out some objectionable quality of it.

503 A. I have stated that the objectionable quality was that it did not contain anything which combined with the oil to make a tough elastic body, but the toughness and elasticity depended wholly on the oil itself as a dryer.

Q. Now, Mr. Ladd, if you were to use any one of th-se inert pig-

ments alone, that may be an objection: but if you use a small portion of it say, all the way from five to twenty per cent., would there be that same objection?

A. Well, I wouldn't expect it to be a sudden change from no objection to objectionable quality in any one per cent.; it must grade up and it would have to start from the beginning.

Q. You know, Mr. Ladd, that there are any number of high authorities who regard the fact that carbonate of lead is not inert as a decided objection to it, do you mean?

A. Yes sir.

Q. Are you not aware of that?

A. Yes sir; that is the carbonate portion of it.

Q. I am talking commercial carbonate of lead.

A. Well, I am talking about the carbonate portion of the carbonate of lead, the commercial product, yes sir.

Q. If a pigment thoroughly mixed with linseed oil, what is the objection that can be raised upon the ground that there is no chemical combination formed?

A. Why, the formation of a tough plastic, varnish-like body tends to protect and to prevent the cracking and the checking of the building.

Q. Then you think that a paint made only of silica and linseed oil would crack more than a paint made of carbonate of lead and linseed oil?

A. The silica would have nothing to do with this prevention of cracking: it would be the linseed oil.

504 Q. I ask you whether that film, that cover, would crack or peel more than a paint made by the combination of carbonate of lead and linseed oil.

A. From experience I couldn't say.

Q. Will you say that a combination of silicate of magnesia with linseed oil, used to cover a surface, will crack or peel or break more readily than a combination of carbonate of lead and linseed oil?

A. No, I wouldn't say that.

Q. Will you say a combination of gypsum with linseed oil will crack or peel or break or disintegrate more readily that a combination of carbonate of lead and linseed oil?

A. I think that would depent on the character of the product to some extent.

Q. Assume good gypsum, would this combination crack more readily or break or peel more readily than a combination between carbonate of lead and linseed oil?

A. Perhaps alone not.

Q. A combination between barytes and linseed oil, would that crack or peel or break more readily than a combination between carbonate of lead and linseed oil?

A. I shouldn't expect it to be as elastic.

Q. I ask you whether it would not last as long?

A. You asked me whether it would crack.

Q. Whether it would not last as long.

A. That I couldn't say.

Q. Now, I ask you again, will it crack as readily?
A. I should expect it to crack more readily.
Q. You should expect that to crack more readily?
A. I should, yes.
Q. What would cause it to crack?
505 A. The fact that it does not contain this tough elastic formation due to the hydrate, to the lead soap, lead linoleate, I should expect it to be more likely to crack.
Q. But, on the other hand, it being a permanent body, would it not be very much less liable to disintegrate?
A. The silica would itself, yes sir.
Q. And how about the silicate of magnesia?
A. And the silicate of magnesia, yes sir.
Q. And how about the gypsum?
A. That would depend upon the purity of the product.
Q. How about the barytes?
A. That being an inert body——
Q. Would not disintegrate?
A. Would not disintegrate.
Q. Now then, does not this faculty of not disintegrating outweigh the objection that you made upon the ground that there is not formed a tough, elastic body by the combination between that pigment and the linseed oil?
A. Only in part.
Q. What is the object of the toughness or elasticity of the body *expect* to add durability to the paint?
A. That is what it is intended for, yes sir.
Q. If there is durability added from some other quality of another pigment, then you have balanced the two, haven't you?
A. If it is added, yes sir.
Q. Now then, the fact that this elasticity or toughness of the paint produced by the chemical combination between carbonate of lead and linseed oil adds to the durability of the paint, is not something that you can speak of from your personal observation
506 or your personal tests or examinations?
A. I have made no practical tests that have been extended over time to test this feature, no sir.
Q. It is then, purely theorizing on your part, is it not?
A. Theorizing and chemical.
Q. Theorizing on the basis of your chemical knowledge?
A. Yes sir.
Q. Is it not recognized that a paint made of lamp black and oil will outwear many times any lead and oil paint?
A. I couldn't say.
Q. You couldn't say because you don't know?
A. Because I have not experimented, yes sir.
Q. Why, Professor, Ladd, is it thar *is* some respects, when I ask you a question, you say you cannot say because you have made no tests and in other matters, when I ask you a question, you give an opinion based on your chemical knowledge?

A. Because I have made a study of these features and of the others I have not made a study.

Q. You mean book study?

A. Yes sir.

Q. Now, what book has taught you that chemical combination between the pigment and the linseed oil is necessary to give a proper quality to the paint?

A. I think it is Church, one of them; I am not sure without looking at the books which of the others, but I can refer to them.

Q. You quoted yesterday from Mr. Hooker's book?

A. Yes sir.

Q. Did you quote from it because you regard it as a good book?

A. Yes sir, in general, I did.

507 Q. Does not Mr. Hooker, at the bottom of page 39 and the beginning of page 40, say, after speaking of the claims of a certain manufacturer of corroded lead, the following: "While the views expressed by this manufacturer may be well taken, after all, it is rather begging the question, since with the best of lead and oil chalking will take place. This is due, without question, to the well known fact that white lead promotes the slow oxidization or drying of the oil and the ultimate product of this oxidization is a dry powder without life or elasticity. Lead hastens this end of completed drying much more rapidly than any other pigment, and so, unless some means is used to retard the action, the oil perishes and the dry lead alone is left to wash or chalk off."

A. That is what takes place in the course of time.

Q. Is sublimed white lead crystalline?

A. That I couldn't say.

Q. You have never examined the product?

A. Microscopically, no sir.

Q. Is it not amorphous?

A. I think they c,aim that for it. I couldn't say without consulting an authority again.

Q. The fact that it is made by a sublimation process would not lead you to conclude that it is amorphous?

A. No sir, not necessarily.

Q. And the fact that it is produced without grinding would not lead you to conclude that it is other than crystalline?

A. No sir.

Q. Well, if, as a matter of fact, it is not crystalline but amorphous, you are simply ignorant of the fact; isn't that so?

508 A. Yes sir.

Q. The objection that you have to the crystalline form of the dry pigment is that it is coarse?

A. Yes sir, the coarseness of it.

Q. Then crystal-inity in itself is not the objectionable feature but the coarseness of it?

A. Yes sir.

Q. Now, is what you have said about sublimed white lead in your bulletin true where you speak of it as exceeding in fineness of the particles the ordinary grades of white lead?

A. That is the best information I could gather from the authorities.

Q. Have you had any better information since then?

A. Not in regard to that feature, no sir.

509 Redirect examination.

By Mr. WATSON:

Q. You stated yesterday from the best obtainable source you found the total production of carbonate of lead in 1890 was about 65,000 tons: is that correct?

A. Yes sir, it should have been seventy-five in my first, is '90.

Q. 75,000 in 1890 and about 200,000 in 1905?

A. One of the best estimates I could get.

Q. How did the average price of the carbonate in 1905 compare with its average price in 1890 in the United States?

A. Quotations indicated it to be from about ¾ of a cent to one cent higher per pound in 1905.

Q. In one of Mr. Zeisler's questions in relation to zinc lead white, he assured that that pigment as now produced and put upon the market by the United States Smelting Company no longer showed the presence of zinc sulphate, and inquired of you whether, if that assumption were true, it obviated or removed the objections in your mind to the use of zinc lead white as a pigment in the preparation of mixed paints. I will ask you, assuming that to be true, if there are other objections which suggest themselves to your mind as a reason why you still would reject the use of this zinc lead white as a pigment and, if so, what they are.

Mr. ZEISLER: Objected to as not being redirect examination and as having been gone into fully on the direct.

A. Well, one of the objections would be that the time has
510 been so short that, if it has been removed, not sufficient experiments have been made to cover a sufficient period of time so that it would be safe to draw a conclusion to that effect.

Q. One of the books from which you quoted in your direct examination, in which it was stated that the presence of zinc sulphate in the zinc lead white was in varying proportions, bore the date of 1898, as I remember it?

A. I think that was the date that was given, yes sir.

Q. Whose work was that, Sabin or Hurst'*d*?

A. Elliss's.

Q. Then, if there has been an improvement in the presence of the production of zinc lead white so as to eliminate from it as a commercial product sulphate of zinc, it has been since 1898?

A. Presumably so, yes sir.

Q. Your idea as I understand it, is that a seven years' trial assuming it has now been eliminated as to the presence of zinc sulphate, is not a long enough period to definiately establish its scientific usefulness and value as an ingredient in the preparation of mixed paint?

A. I should not consider that it was sufficiently long to establish the fact, since there has probably been a gradual improvement of any new process of the manufacture.

Q. Mr. Zeisler, in his cross examination, asked you in regard to any authorities which you could produce from scientific works in relation to the variable constituents or variable character of lithophone, zinc from western ores, and other substituted pigments used in the preparation of mixed paints, did he not?

A. Yes sir.

511 Q. Since that time have you looked over such scientific works relating to this subject as have been at your disposal here in St. Paul?

A. I have.

Q. Referring to Prof. Sabin's work on "Technology of Paint and Varnish," already referred to in the evidence, I will ask you if, on pages 120 and 121, he uses the following language, under the subhead of Lithophone: "Another white paint containing zinc is known by the trade name of lithophone. It is essentially the sulphide of zinc mixed with a variable percentage of barytes. White lead and white zinc are practically the only white pigments used in oil or varnish; other white powders, such as powdered gypsum, (sold under the name of terra alba), whiting (which *i*t powdered chalk—carbonate of lime), kaolin and barytes, are used as adulterants although they are actually pigments *o*n value in paints ground in watery vehicles. The reason is that they are in their nature transparent and appear white just as glass ground to a powder does, but when mixed with the oil, the refractive index of the oil is nearly that of those pigments and so they become transparent again. Watery vehicles such as are used in water colors, fresco paints and calsomine, evaporate and leave them to show their power of reflecting white light. So that whiting, which was a favorite pigment with the ancient painters, who used a watery solution of glue, or of albumen, as vehicle, is of very little value to the oil painter, and it is moreover, an alkaline substance which attacks and after a time destroys the oil. Barytes is perfectly neutral; it is sulphate of

512 barium, a most unchangeable salt. When chemically precipitated it is known as blanc fixe, and this is made as a by-product in some chemical factories; being amorphous—while ordinary barytes is crystalline—and extremely fine, it is somewhat better than any of the other adulterants, and possibly has a little value of its own." That is correct? is it?

A. Yes sir.

Q. Referring to the work of J. Cruickshank Smith on the Manufacture of Paint, published in London in 1901, I will ask you if the following language appears on pages 89 and the following under the heading "Sulphide of zinc:" "Sulphide of zinc is a pigment which in a modified form, known variously as lithophone, new white, etc., has during recent years come to be much used as a better substitute for the oxide. Pure sulphide of zinc corresponding to the composition ZnS is a white pigment of permanent character resembling zinc oxide in its general characteristics. It has however

gone out of use, its place being taken by the modified forms referred to. These consist, with slight variations, of sulphate of barytes on which sulphide of zinc has been "struck" in a manner familiar to color makers by a precipitation process. The proportion of actual sulphide varies greatly, the best grades containing about 33 per cent. and the lower 20 to 25 per cent. The remarks on the grinding of oxide of zinc apply in general to these sulphide pigments as well, but they cannot be considered as altogether satisfactory substitutes for the oxide, *for every purpose* for which the latter is suitable, chiefly on account of the difficulty of obtaining them of per-
513 fect and permanent whiteness. The opacity of the best brands is excellent, and the pigment can in very many cases be successfully substituted for white lead for decorative purposes." That is correct, is it?

A. That is correct, yes sir.

Q. And I will ask you Professor Ladd, if you have also looked into the books as far as accessible to you, in relation to barytes and its uses in the preparation of paint.

A. Yes sir.

Q. I will ask you if I quote correctly from the work of Mr. Smith just referred to in relation to barytes. I read from the bottom of page 90: "As a rule white lead or zinc paint containing an appreciable proportion of barytes tends to turn softer on keeping." And I will ask if, referring to the subject of whiting, Mr. Smith on pages 91 and 92 of the same work, uses the following language: "Powdered Chalk (carbonate of calcium) which is known variously by the foregoing names, cannot strictly be called a *white* pigment; nevertheless it may be conveniently referred to here. From the paint manufacturers' point of view there are two main uses for this article—(1) It is a convenient cheapening agent, along with sulphate of barytes, for admixture with colored pigments, and (2) it is the basis of that widely used article, *glazier's putty* and also to a less extent of many grades of the article known as *patent driers*. As an adulterant it is used for the most part along with barytes, its lightness and cohesive nature in oil tending to neutralize the weight and open texture of barytes. In practice the relative proportions of barytes and whiting that are found most satis-
514 factorily in ordinary cases are 2 to 3 parts of barytes and 1 part of whiting. The use of too large a proportion of barytes will cause the paint to turn soft and to separate from the oil, while the whiting if present is too large quantity will on account of itd opacity destroy the coloring power of the pigment. Ordinary whiting requires about 23 per cent. of oil for grinding." Have I quoted that correctly?

A. Yes sir.

Q. I have quoted correctly both of the extracts which I have just read, have I?

A. Yes sir.

Q. Have you found some further comments upon white lead and other pigments since your cross examination yesterday?

A. Yes sir.

Q. Referring to Hurst, on page 42, I read the following: "As a pigment white lead possesses all the good qualities desired by a painter—namely, good color, body or covering power and permanency. It is distinguished from all other pigments by the ease with which it mixes with oil and forming a paint which readily flows from the brush, whereas most pigments, as for instance, barytes, tend to work what the painter calls slimy or livery, and streaky; white lead does not exhibit this property, but flows freely and evenly from the brush. This feature is generally ascribed to the lead hydroxide in the white lead combining with some of the oil and forming a lead soap which, dissolving in the rest of the oil used in the preparation of the paint, forms a kind of varnish; this varnish takes up the lead carbonate to which is due the body or covering power of the pigment. Sometimes this chemical
515 combination between the lead hydroxide and the oil extends to the lead carbonate and then the white lead losses its opacity and becomes more or less transparent or horny: the conditions most favorable to the production of this change, which is of rare occur-ence, are not properly known. This fact of the white lead forming a chemical combination with the oil, is well known to color makers, who have endeavored, by the addition of basic bodies, to bring about a similar action in the case of other white pigments, such as zinc white and barytes, but so far without any great success." Have I quoted correctly?

A. That is correct.

Q. Referring to Prof. Church's work on The Chemistry of Paints and Painting, published in London 1901, at page 131 Prof. Church says: "On the other hand the quality of the whiteness of the best flake-white is unimpeachable: the paint works admirably in oil, and has great body: moreover, flake white not only mixes perfectly and safely with the majority of permanent pigments, but it serves to impart to slow drying colors its own strongly siccative character. Besides all these merits white lead possesses a valuable property, which has scarcely been clearly recognized or duly appreciated. For when an old oil picture is carefully examined, it will generally be found that if any portion of its surface (of the paint, not the varnish) shows decided contractions and cracks, these are practically those portions into which white lead has entered in smallest proportions, if at all. The most translucent parts, the rich
516 glazings and the deepest shadows may be fissured, but not the high lights: examples illustrative of this point are referred to in Chapter XXIV of the present volume. This property of white lead seems to depend upon a combination taking place between a part of the oil with which it is ground and a part of the lead hydrate which it contains. A kind of lead soap (lead linoleate) is thus formed; this compound imparts a degree of toughness and elasticity to those films of oil paint into which lead white enters to any considerable extent."

A. That is correct.

Q. Then lead white is, of course, carbonate of lead?

A. Yes sir.

Q. Referring to page 129 of Prof. Church's work, I read the following extract: "Of the intentional adulterations of white lead the following are the most usual (*a*) Heavy spar, that is, native barium sulphate; or the same compound artificially prepared (permanent white, *blanc fixe*); (*b*) gypsum; (*c*) China clay; (*d*) whitening or chalk; (*e*) lead sulphate. Barium sulphate, in the form of finely ground barytes, or heavy spar, is the material employed on the large scale for cheapening the cost of production of ordinary white lead: precipitated, that is artificially prepared, barium sulphate is used in the case of the finer makes of this pigment." Is that correct?

A. That is correct.

Q. Does Prof. Church, at the bottom of page 130, use the following language: "It has been observed that white lead is less liable to be blackened by sulphuretted hydrogen and by other
517 sulphides when it contains a small quantity of baryta-white or of lead sulphate thoroughly incorporated with it by grinding. This observation opens the door to adulteration, it is true; and it is perhaps wiser to rely upon the protection furnished by resinous mediums and a final coat of mastic varnish rather than upon any admixture with other white substances." That is correctly quoted, is it?

A. That is correct, yes sir.

Q. One of the exposures which would be covered by this language of Prof. Church would be the exposure of a surface covered with a coat of paint to the influence of atmospheric conditions in which there was smoke in the air."

Mr. ZEISLER: Objected to as calling on the witness to interpret the language which the court is just as capable of interpreting without the aid of the witness.

A. Yes sir.

Q. Devoe & Raynolds Company, a corporation, are one of the complainants in this suit, are they Prof. Ladd?

A. Yes sir.

Q. I will ask you if the book which I show you and which is labeled "Painters' Materials; Devoe & Raynolds Co., New York, Chicago" is, to the best of your knowledge, put forth by the complainants Devoe & Raynolds Company in this case?

A. I should say it was purported to be.

Q. Referring to page 50 of this catalogue, near the top of which is contained a picture of a can of paint, upon whic- appears the label, "Devoe Lead and Zinc Paint, Ready for Use, Outside White
518 547. Manufactured by F. W. Devoe & Co., New York-Chicago." I will ask you if below the picture of this can there appears the following language: Devoe Lead and Zinc Paint. Ready for Use. Notice: These paints are strictly pure and sold subject to chemical analysis. Notice: These paints are put up strictly full measure. Notice: These paints are made *only* of pure white lead, pure white zinc, pure linseed oil, pure turpentine dryer, pure tinting colors."

A. That is correct.

Q. I will ask you if, on page 56 of the same catalogue of Devoe & Raynolds Co. there appears the following: "Globe Mixed Paint," and immediately thereunder a picture of a can, the lettering upon which is as follows: "Globe prepared paint, shade O. W. Chicago, Illinois." Globe Paint, ordinary shades, in 1 gal. cans, by gal. 1.25; Globe Paint, ordinary shades, in ½ gal. cans, by gal. $1.35; Globe Paint, ordinary shades, ¼ gal. cans, by gal. $1.45; Globe paints, ordinary shades in ⅛ gal. cans, (pint), by gal. $1.65; Globe Paint ordinary shades, in 1/16 gal. cans (½ pints) by gal. $1.85. Shade No. 50 (Green), 25 cents per gal. advance over ordinary shades. Shade No. 43 (Vermilion), 50 cents per gal. advance over ordinary shades. Outside and Inside White and Black are same price as ordinary shades. The list price of 5 or 10 gal. kits *are* of ½ bbls. is 5 cents per gal. less than 1 gal. cans; bbls. 10 cents per gal. less than 1 gal. cans. Globe Paint is the cheapest house paint we make. If we knew how to cheapen it without going back to the old emulsion plan, we would do it. We don't believe in using water in oil paint, and therefore Globe Paint is probably better than some brands on the market which are sold at a higher price.

519 Globe paint has its use both for outside and inside work." I have quoted correctly, have I?

Mr. ZEISLER: Objected to as immaterial and irrelevant.

A. Yes sir.

Q. I will ask you if, on page 54 of the same catalogue, there appears under the designation "Queen Bee Paint," the picture of a can of paint upon which is the following printed label: "Queen Bee Mixed Paint," Ready for use; guaranteed the most durable and economical in the market. Outside White. Chicago." And if, underneath the can there appears the following: "Queen Bee Paint is better paint than its price indicates: putting it another way, the price of Queen Bee Paint is very low for so good a paint. We do not put our firm's name on the package, yet we have sold it to many customers for years: they tell us it is good enough for them either for ouside or inside work. If something lower priced than the best is wanted, try Queen Bee."

Mr. ZEISLER: Objected to as immaterial, irrelevant and incompetent.

A. That is right.

520 Recross-examination.

By Mr. ZEISLER:

Q. You spoke of the price of carbonate of lead this morning and yesterday you spoke of the price of various other pigments. Please state whether you ever purchased commercial carbonate of lead as a dry powder in barrel lots?

A. I never have purchased it.

Q. You have never purchased it in any quantity?

A. No sir.

Q. Of course you have not purchased it in carload lots then?
A. No sir.
Q. Have you purchased any of the other pigments about whose prices you spoke yesterday.
A. No sir.
Q. Have you ever contracted to purchase any of these white pigments?
A. I have not.
Q. Then all this information that you possess regarding the prices of various pigments is what you have gathered from the few copies of certain trade journals that you have referred to?
A. Yes sir.
Q. I understood you to say that you never have made any examination either of the chemical or physical properties of zinc lead white in its commercial form?
A. I have not.
Q. You know absolutely nothing about what has been the composition of that article, of your own knowledge?
A. Not of my own knowledge.
Q. And you don't know anything about the composition of
521 that article even so far as your information might be based upon the findings of others subsequent to the analysis given by Mr. Ellis in his book of 1898?
A. Only so far as they are referred to in these other books.
Q. Have you referred us to any other book wherein there is given an analysis of zinc lead white made later than 1898?
A. No sir, not an analysis.
Q. I was speaking of the chemical composition. Then you have absolutely no knowledge as to what others found in regard to the chemical composition or the ingredients of zinc lead white later than 1898?
A. No sir.
Q. You think that within eight years it is impossible to have so improved the process of making zinc white as to exclude the presence of zinc sulphate except in unappreciable quantities?
A. I don't think I stated it that way.
Q. You don't state it that way now, at any rate?
A. No sir.
Q. You don't mean to be so understood?
A. No sir.
Q. For all you know to the contrary, any number of manufacturers or their chemists might within the last eight years have analyzed large quantities of zinc lead white without finding appreciable quanitites of sulphate of zinc therein?
A. Certainly.
Q. The work from Smith from which you have been asked to verify the quotation regarding sulphide of zinc as being the characteristic portion of lithopone, have you found anything in that book from which you could conclude that Mr. Smith had under
522 observation any American make of lithophone?
A. I couldn't say on what particular product he was basing his conclusions, no sir.

Q. Lithophone is made in England is it not?

A. I understand so, yes sir?

Q. In spite of what Mr. Smith has to say on whiting, I understood you to say that you regard the use of five per cent. of that article as a proper ingredient by reason of its tendency to neutralize free acid?

A. I don't think I stated that in regard to whiting.

Q. Didn't you say that in regard to calcium carbonate?

A. Well, there is a difference between calcium carbonate and whiting in some respects.

Q. Is not whiting calcium carbonate?

A. It is one form of it yes sir.

Q. Then you do not object to calcium carbonate but you object to the form of calcium carbonate known as whiting?

A. No, I have stated that the presence of perhaps five per cent. might be used for the purpose of neutralizing acidity, but didn't state that I had recommended it; that was not what I stated.

Q. You spoke, of course, only from the chemical standpoint?

A. I spoke from the standpoint of their claiming it was acid.

Q. You cannot speak from the standpoint of the manufacturer of the practical usefulness of an article containing five per cent. of calcium carbonate?

A. Not from the manufacturers standpoint.

Q. Now can you speak of it from the consumers stand-
523 point, can you, not having practically tested the value of those ingredients in mixed paints?

A. Well, no, only so far as observation goes.

Q. What do you mean by that? What observation have you made of paints containing five per cent. of calcium carbonate?

A. Well, not exactly five per cent. but more than that.

Q. What observation have you made with paint containing more than five per cent. so far as the practical use of it is concerned?

A. On my house it is not working well.

Q. You know, because the paint on your house does not work well and because it contains a certain amount of calcium carbonate, that therefore it is the presence of the calcium carbonate which prevents the paint from working well?

A. No, I didn't state that.

Q. It has got white lead in it too, hasn't it?

A. Yes sir.

Q. For aught you know to the contrary, the former painting on your house, about which you spoke yesterday, may have been done with a paint likewise containing calcium carbonate?

A. I think it did contain some.

Q. Mr. Church's book is entitled, is it not, "The Chemistry of Paint and Painting?"

A. I think it is.

Q. And Mr. Church described himself on the title page as a Professor of chemistry in the Royal Academy of Arts in London?

A. Yes sir.

Q. Now, is it not true that the writer, in his preface says: "In

the present volume the materials and methods of the painter
524 of pictures are viewed mainly from the chemical standpoint?
A. Yes sir.

Q. And, again, "It has been written with a view of explaining to artists, whether they be accomplished masters or commencing students, the chief chemical and physical characters of the materials with which they deal and of the operations they practice."

A. I presume that is correct.

Q. Look at it and see whether it is not exactly correct.

A. I should say it was yes sir.

Q. Oil paintings are not usually exposed to the influence of atmospheric conditions, are they?

A. They would be more like interior paintings?

Q. Exactly. You wouldn't expect sulphuretted hydrogen to be present where oil paintings are hung?

A. Well, it might be in a house.

Q. Now, Mr. Church says in this book on page 131, does he not, "The drawbacks attendant upon the use of white lead as a paint are its poisonous character, its sickly and noxious smell when used with oil, and its liability to discolor when exposed to sulphuretted hydrogen or any sulphide soluble in water."

A. Yes sir.

Q. You say that oil paintings are probably in the same condition with reference to outward influence as inside painting, inside house paints?

A. I said more nearly like, yes sir.

Q. Now where paint is used on the inside of buildings to cover walls or floors or ceilings or window frames and other such
525 things, the paint is washed from time to time, is it not?
A. Yes sir.

Q. And in such cases the paint is subjected to the influence of moisture?

A. It is.

Q. The same thing is not true of oil paintings, is it?

A. No sir.

Q. Now, where Mr. Church, on page 129, speaks of the intentional adulterations of white lead, he meant, of course, adulterations of white lead for uses in oil artists' colors?

A. Well, I couldn't say. He may have or he may not, but he is dealing more largely with that subject.

Q. Artists do not buy mixed paints, do they?

A. No sir.

Q. They buy so called tube colors, don't they?

A. That is what I understand, yes sir

Q. Is it true that Mr. Sabin, in the preface of his work says, "Things which many people will wish to know are left out, in many cases because of the limitations of the author's knowledge."

A. Yes sir.

Q. Again, does Mr. Sabin, on page 120 of the work from which you have quoted, say this: "White lead as commonly used, is not chemically an extremely stable compound. The carbonates are all

rather easily decomposed, and the hydrate is in a form which will unite with acid substances with great readiness. Owing to this we find that in time (not very rapidly) it combines with linseed oil and more rapidly with varnishes, some of which contain a little acid."

A. Yes sir.

526 Q. Hurst, in the passage quoted from this morning, on page 43, where he speaks of the chemical combination between the lead hydroxide contained in carbonate of lead and the oil, places zinc white and barytes in the same class so far as lack of chemical combination is concerned, does he not?

A. Yes sir.

Q. Did I understand you to say that oxide of iron paints had a rough finish?

A. I said they were usually not expected, as they were found on barns, to have the same finish.

Q. Now, isn't that oxide used in the finest coach colors, where a finish is all important?

A. Yes sir, it is in that case.

Q. Smith, in speaking of lithophone, remarks upon the offenses of the white at times.

A. Yes sir.

Q. Assuming that that would be correct, that would only be an objection in the white and light tints?

A. So far as I know, yes sir.

Q. Your objection to the whiting, as I understand, is that it is al*ike*line?

A. It is apt to be, yes sir.

Q. Now, are you aware of the fact that white mineral primer is not alkaline?

A. I couldn't say in regard to that.

Q. You don't know anything about white mineral primer, I believe you said?

A. No sir.

Q. You mean you don't know anything about it? That is so?

A. Yes sir.

527 BERGER M. JOYSTAD, sworn.

Examined by Mr. WATSON:

Q. Where do you reside, Mr. Joystad?

A. St. Paul.

Q. What is your age?

A. 51.

Q. In what business are you engaged?

A. In the paint; been all my life.

Q. In the manufacture of paints?

A. In the manufacture of paints, yes sir.

Q. Including the manufacture of mixed paints or paints already for use when the can or container is opened?

A. Well, in all line of branches.

Q. With what company are you engaged in the manufacture of paint?

A. T. L. Blood & Company.

Q. Is that the T. L. Blood & Company who originally appeared as one of the complainants in this suit which is now being tried?

A. Yes sir.

Q. What position do you hold with the firm of T. L. Blood & Company?

A. Superintendent of Factory.

Q. How long have you held that position?

A. 22 years.

Q. You have been here in St. Paul for the past 22 years?

A. Yes sir.

Q. And all of that time you have been in the service of T. L. Blood & Company?

A. Yes sir.

Q. About what is the annual output of T. L. Blood & Company in the matter of the manufacture and production of mixed paints?

A. About 100,000 gallons per year.

528 Q. Then if there are only 100 paint manufacturers in the United States whose total annual product is 100,000 gallons, or in excess of that, the firm of T. L. Blood & Company would fall within that class of 100 leading or large manufacturers, would it?

Mr. ZEISLER: Objected to as immaterial and incompetent and as a question that answers itself and simply takes up time and space in the record.

A. Yes sir.

Q. Were you employed in the manufacture of paint prior to your connection with T. L. Blood & Company?

A. Yes sir.

Q. Where?

A. Heath & Milligan, Chicago.

Q. That is the Heath & Milligan Company which is one of the complainants in this suit?

A. Yes sir.

Q. Where were you employed with them at Chicago?

A. At Chicago, yes sir.

Q. In their factory?

A. In their factory.

Q. What position did you hold in their factory?

A. I had charge of the mixed paint department and advertisements at the time.

Q. Well, what other positions did you hold with that company?

A. Well, the very first I got there I was in the paint shop a painter by trade.

Q. What position were you holding with Heath & Milligan Company just prior to your coming to St. Paul and entering the employ of Blood & Company?

A. I had charge of the paint factory and the advertisements; that is what I had all the time I was there.

Q. What are your duties as superintendent of T. L. Blood & Company?

A. Well, testing the colors of all kinds and descriptions, of course; testing the colors and the materials; in charge of the fac-

529 tory.

Q. Have your duties to do with the selection of pigments and their materials used in the preparation of mixed paints?

A. Yes sir.

Q. In that way have you become familiar with the properties and values of different ingredients used in the preparation of mixed paints?

A. Well, I would, yes sir.

Q. You have been superintendent of the factory, I understand, for the past 22 years?

A. Yes sir.

Q. Has the firm of T. L. Blood & Company during that time been p*ptt*ting upon the market various kinds of mixed paints covering different colors and classes of paints?

A. Yes sir.

Q. Has your connection with this business familiarized you with the properties and qualities of the carbonate of lead and oxide of zinc and also with the pigments which are described here as Class A pigments.

A. Yes sir, they have.

Q. Have you used and tested those pigments and reached conclusions as to the value and stability of the same for use in the -reparation of mixed paints.

A. I have.

Q. Have you made tests and endeavored to find out by practical demonstrations the comparative efficiency and value of carbonate of lead and oxide of zinc and the other pigments called Class A?

A. That has been my main duty all my lifetime, since I got in the business.

Q. You have been trying to determine and test the comparative value of these different pigments, have you?

A. Yes sir.

530 Q. What are the desired qualities, valuable qualities of carbonate of lead as a pigment in the preparation of paint?

A. Well, to my knowledge it is the leading pigment of them all: you can call it the king of all pigments.

Mr. ZEISLER: I move that the answer be stricken out as not responsive to the question.

Q. What are the qualities as to opacity, durability or other particulars which in your mind entitle it to be denominated as the king of all pigments?

A. That is carbonate of lead.

Q. Which are the qualities which entitle it to that name.

A. Well, carbonate of lead and oxide of lead.

Q. Why do you consider it the best of all pigments?
A. Because it works the best and flows easiest from the brush.
Q. What about oxide of zinc as a pigment?
A. It is a very good one: it is a perfect white.
Q. What about the use of carbonate of lead and oxide of zinc in conjunction with each other as pigments?
A. It is very good.
Q. Do you know of any other pigments which are as valuable and which produce as good results in the preparation of paint when used as pigments as carbonate of lead and oxide of zinc?
A. No, I do not.
Q. Are there any others?
A. Not that I know of.
Q. Have your tests and your investigations on the subject brought to your attention any other pigments which possess as good properties and are as valuable for use as ingredients in the preparation of mixed paints as carbonate of lead and oxide of zinc?
A. No, I have not, because what one lack*ing* the other has.
531 Q. And the two in combination produce, as far as youe investigation has shown, the most useful and the paint with the best quality?

Mr. ZEISLER: Objected to as leading.

A. Yes sir.
Q. Do you know the pigment called sublimed white lead?
A. Yes sir.
Q. Does the firm of T. L. Blood & Company use that in the preparation of their paints?
A. No sir.
Q. Why don't you use it?

Mr. ZEISLER: Objected to as incompetent and immaterial and irrelevant.

A. Why, because we don't think it is satisfactory to use.
Q. Why isn't it satisfactory?
A. Well, the record from far back has told us and that is the reason we are afraid of it.
Q. What is the record from far back which has, in your opinion, made it undesirable for use as a pigment?
A. Well, the trouble of it, it hardens in the package, and the working quality of it.
Q. Well, what about the working quality of it?
A. Well, it don't work near as well as carbonate of lead or oxide of zinc. It has a tendency to drag and set, tough working.
Q. Is that an objection which is made and which you have met with in the preparation of paint in which sublimed lead was used?
A. Yes sir.
Q. That is a complaint which would come from the painters who used the paint, is it?
A. Yes sir.

Mr. ZEISLER: Mr. Watson, I hate to interrupt you by objections to the form of the question.

532 Mr. WATSON: Well, that is so very obvious.

Mr. ZEISLER: If it is obvious, there is no necessity of puting the question.

Q. And you say the tendency is for the paint in which it is used to harden on the can?

A. Well, especially in the paste form. In liquid form we have never tried it.

Q. You have never tried it in liquid form?

A. No.

Q. What do you say about the qualities and the value of standard zinc lead white for use as a pigment in the preparation of mixed paints?

A. Well, I don't think it fills the bill.

Q. Why doesn't it fill the bill?

A. Well, the trouble of it is crystalline; after its grinding, in a few years it comes back to crystal again: and the whiteness of it ain't perfect.

Q. It crystalizes after it has been——

A. Ground in oil.

Q. What effect does the forming of crystals have as an objection to the usefulness of a paint in which it has been used as an ingredient?

A. Well, it would be by spreading it under the brush, it wouldn't look smooth and have any nice finish to it.

Q. Has that been an objection which you have met with when this product known as zinc lead white has been used as an ingredient?

A. Well, it is.

Q. Do you use, in the preparation of paints with Blood & Company, zinc made from western ores?

A. Yes, we have been using Mineral Point Zinc; that would come under that name, wouldn't it? The best grades, we have found them satisfactory; the second grades I have not found satisfactory.

Q. Mineral Point is the trade name for this western zinc
533 which is produced in Wisconsin, is it?

A. Yes.

Q. Now, how many grades are there of that zinc upon the market?

A. Well, there is three or four, with what you call the leaded zinc.

Q. Will you give us the names of these different grades, beginning with the highest?

A. There is prime, selected standard and selected, and then the leaded zinc, the fourth.

Q. Generally speaking, how does this mineral point zinc compare with the New Jersey zinc which is generally known under the name of oxide of zinc?

A. Well, the best grades, I think is equally as good, so far as I know: we have used them both.

Q. To which class now of the product do you refer when you say it is equally good?

A. To the prime?

Q. What is the objection to the use of the lower grades of Mineral Point zinc?

A. Well, it don't work as well and it don't make as good a paint.

Q. What chemical ingredients do they contain which makes their use objectionable?

A. Well, of course, I am not posted; I wouldn't state.

Q. You are not a chemist?

A. No.

Q. Do you know whether these zincs made from western ores carry varying proportions of sulphate of lead?

Mr. ZEISLER: If you know.

A. No, I ain't quite sure about that; I wouldn't state that. I have heard.

Q. Are you acquainted with the pigment called lithophone?

A. Yes, sir.

534 Q. Do T. L. Blood & Company use that as a pigment in the preparation of paints?

A. No, sir.

Q. You don't use it in any form in your factory?

A. Yes, we use it in enamels, cheap enamels.

Q. Do you make enamel paint in your factory of more than one grade?

A. Yes, two grades.

Q. Now, referring to the first of these grades, what are the ingredients used in its preparation?

A. The first grade we don't use anything else except French Zinc, Green Seal Zinc.

Q. Is that an imported zinc?

A. Yes, sir.

Q. You don't use any carbonate of lead in the preparation of that paint at all?

A. No.

Q. You don't use any lithophone in its preparation?

A. No, not in the first grade.

Q. Then I understand you make another grade or quality of enamel paint?

A. Yes, sir.

Q. What do you use as pigments in the preparation of this second quality?

A. Lithophone.

Q. You say that lithophone is used in your second quality in lieu of French oxide of zinc?

A. Yes, sir.

Q. How does the price of lithophone compare with the price of French oxide of zinc?

A. It is quite a little cheaper.

Q. How much cheaper per pound?

A. Oh, varying from two to three cents.

Q. From two to three cents per pound?

A. Yes, depends upon the market price; of course, sometimes it varies more.

Q. What is the difference in price now?

535 A. I ain't quite posted on that.

Q. What is the difference in the price of these two products of enamel paint which you put out?

A. Well, there is quite a difference.

Q. Well, tell us how much in the case of a gallon can of enamel paint of these two classes?

A. Oh, it would vary from about 50 to 60 cents a gallon.

Q. From 50 to 60 cents a gallon is the difference in price between these two products of enamel paint?

A. Yes, sir.

Q. Now, which is the superior enamel paint as to the quality of glossy finish, the quality of durability and hiding power and all other good qualities of an enamel paint?

A. Well, that is a question that is pretty hard to answer. It would need some explanation in between there.

Q. Well, give us your explanation.

A. You see, take the first grade, I think the more satisfactory all around is the one that is made from the Green Seal zinc. In the case of a painter wanted to change the shade, he can make any color he chooses out of it. Now comes the second grade, the same that is made from the lithophone, of course it got a good deal richer body. The trouble of it you cannot depend on the whiteness; it is liable to turn yellow, and it cannot be tinted with any shade you want to; you cannot put out any lead or copper pigments in it. Any other wise it is all right.

Q. In other words, in the preparation of enamel paint in which the French oxide of zinc is used as a pigment, there may be added lead and other coloring matters to give it a different shade?

536 A. Well, any tints, you know, to strike it off from a white, you know, to different colors. Of course, a good many times they want different colored enamels, you know.

Q. And that cannot be done in the second quality, manufactured from lithophone?

A. No, not satisfactorily, no.

Q. What do you say about the second product, in which lithophone is used a pigment, becoming yellow or not retaining its white color?

A. That is the trouble. I found also to have the material standing any length of time it is likely to turn yellow itself.

Q. Suppose that you compare the two classes where they are used for the purpose of obtaining a perfectly white surface upon the material to which they are applied: will the class in which the zinc is used as a pigment give the better result, or will the one in which the lithophone is used give the better result in that particular.

A. The one from the French zinc is used to give the best result.

The trouble with the lithophone is, it is liable to turn dark if it is put on a surface where there is lead underneath.

Q. Does your firm use lithophone as a pigment in the preparation of any other paint than enamel?

A. No, sir, we have not.

Q. In the preparation of the general classes of mixed paints which your firm prepares and puts upon the market, do you employ any of the ingredients in Class B, which are barium or barytes, silica, silicate of magnesia, calcium carbonate or hydrated sulphate of lime?

A. No, we don't use any of them.

Q. Why don't you use them?

A. Well, because we can arrive what is as good result by not using them, and a great deal better.

537 Q. What in your opinion are the objections which prevent your firm from using them in the preparation of your general line of mixed paints?

A. Well, the reason we don't use them is because there is no need of using them. Of course, where there is lead lacking we find in the zinc and where there is zinc lacking we find in the lead, so that we have all the good features you can possibly ask for.

Q. Do you find any of these pigments referred to in Class B to possess in equal degree the qualities of durability, of body, of opacity and the other desirable qualities which you have mentioned as being possessed by carbonate of lead and oxide of zinc?

A. No, I don't.

Q. Well, have the investigations of yourself and your company been such that, up to the present time, you have not found it desirable to introduce the use of any of these ingredients into the manufacture of your general lines of mixed paints?

A. Yes, sir.

Q. That is true, is it?

A. Yes, sir, that is true.

Q. Do you manufacture any special classes of mixed paints in which you employ any of these pigments mentioned in B?

A. Not mixed paint.

Q. Do you use that at all in the preparation of any paint which comes from your factory?

A. Yes.

Q. What kind of paint?

A. Well, in cheap paste goods.

Q. For what certain work are these cheap paste goods which you mention desired and intended to be used?

A. Well, most of them for agricultural work, and to compete for the prices.

Q. What do you mean by agricultural work?

538 A. Well, manufacturers of farm machinery and plows and all such things, takes altogether all that class of work.

Q. And to whom and for whom are those cheap pastes, as you have called them, principally sold and used, the manufacturers of those articles?

A. Yes.

Q. They are not put upon the market, than I understand, generally speaking, and bought by people generally all over the country, but their sale is confined largely to the manufacturers or agricultural implements?

A. Yes, that is true. Of course, it might be in some cases that they are used in mixed paint, but we never use them.

Q. Your firm never uses them?

A. No.

Q. Now, are these special paints which you have just been describing prepared upon specifications by the agricultural firms who intend to use them, as a rule?

A. No.

Q. You prepare them and sell them to that class of trade?

A. Yes, and according to prices they might get for the article.

Q. Which one of the pigments described in Class B is most commonly used in the preparation of paint which is employed by the manufacturers of agricultural implements, is it barytes?

A. Barytes is the principal one.

Mr. ZEISLER: Mr. Watson, your questions are very objectionable.

Mr. STERN: You put the answers in his mouth by your questions; you are testifying instead of examining.

Q. Are there any other pigments except barytes used in the preparation of this special sort of paint which is employed by
539 the manufacturers of agricultural implements?

A. Well, a small proportion of whiting; it is a good idea to put in a little, you know, to keep the barytes from sewating too much.

Q. Are there any others?

A. No.

Q. How is this preparation which you thus produce and in which barytes and whiting are used as a pigments applied to the farm machinery which is to be covered with paint?

A. They are packed to the farm machinery from our place——

Q. How is the application made, by the brush alone?

A. Well, by the brush; you have to leave the barytes out and you have to find another article if it is especially used for dipping.

Q. I want to know how the paint is applied to the covering of agricultural implements when barytes is used as a pigment for the principal pigment, how is it done?

A. Just by the brush.

Q. Does it often happen that agricultural implements are painted — what is known as the dipping process?

A. Oh yes, oh yes.

Q. Do you prepare a paint for use in covering articles by the dipping process?

A. Yes sir.

Q. What pigments do you use in the preparation of that class of paint?

A. Well, that depends a good deal on the color they want, you know, depends a good deal on the color they want.

Q. Well, will you tell us which one of the pigments in this class B are used in the preparation of that sort of paint?

A. I don't know now how many pigments is in there.

Q. (Handing witness bill of complaint.)

A. Well, especially for dipping, oxide of zinc is the principal pigment used for——

540 Q. Is the preparation which is made for use in dipping agricultural implements——

A. No it is always in paste form.

Q. Then the manufacturer who intends to use it as a paint adds the vehicle or thinner himself, does he?

A. Yes sir.

Q. You heard Professor Ladd's testimony here yesterday, did you?

A. Yes sir?

Q. Did you hear him testify that in his opinion about 70 per cent. of the paints used in North Dakota were mixed white or gray paints?

A. Yes sir, I heard him.

Q. Now does your company sell goods and have a trade in North Dakota?

A. Yes sir.

Q. How *an* extensive a trade *fo* you have in that country?

A. Well, we are doing about one-fifth of our trade up in North Dakota.

Q. Do your goods go generally over the state of North Dakota?

A. Yes sir, all over the state.

Q. Will they be found for sale in most of the towns in North Dakota?

A. I expect so.

Q. Now, from your knowledge of the trade of your house and the sort of paints that are made, would you agree with the estimate of Professor Ladd as to 70 per cent. of mixed paints coming into North Dakota being white and gray in colors, the mixed paints, I mean, so far as your knowledge is derived or based upon the proportions of paints sent to that country from your house?

Mr. ZEISLER: That question is objected to as immaterial and irrelevant and incompetent and improper generally.

A. Well, I agree with Ladd on that statement.

541 Cross-examination.

By Mr. ZEISLER:

Q. You were a tinter in the factory of Heath & Milligan, were you not?

A. Yes sir, I was a tinter and had charge of the factory when I was there. I was there long before they started to make mixed paints.

Q. Did you have anything to do with testing materials in Heath & Milligan's factory?

A. No.

Q. You say you do not purchase any sublimed white lead?

A. No.

Q. How long is it since you purchased the last sublimed white lead?

A. Oh, exactly the year I ain't able to say, but it must be anyway fifteen years ago.

Q. Well, since that time you haven't used it at all.

A. Yes, I have had it and experimented with it; that is all we have done with it.

Q. What was the nature of the experiments that you made?

Q. Well, I tried it both in paste form and liquid.

Q. I am speaking of mixed paints only, Mr. Joystad.

A. Well, I understood you.

Q. You mean you have used it in mixed paints and have done what?

A. We never have used it and sold it in mixed paint, only experimented with it, that is all.

Q. I mean in your experiments.

A. Yes.

Q. Just tell me exactly what you did in your experiments with sublimed white lead in mixed paint.

A. Well, we have tried it both straight and with zinc and lead.

542 Q. What did you do with the paint after you had made it for the experimental purpose?

A. Oh, tried *in* on a board and hung it out for exposure, the same as we does in everything else.

Q. How long did you have it on the board?

A. We had it on the board for five or six years.

Q. And it cracked badly, did it?

A. Well, I wouldn't *day* exactly it cracked badly; it didn't stood any better than the carbonate of lead and oxide of zinc.

Q. It didn't stand better?

A. No sir.

Q. But it stood just about the same?

A. Not a great difference, yes.

Q. No difference?

A. No.

Q. The *the* objection that you have to sublimed white lead is that it hardens in the can?

A. Yes sir.

Q. How does carbonate of lead act in that way?

A. Well, carbonate of lead would settle when it didn't harden.

Q. But it is liable to settle?

A. Yes sir.

Q. And zinc is liable to harden in the can?

A. Yes.

Q. I understand you to *day* that you do not put in the market any of the mixed paint wherein you used sublimed lead?

A. Never.

Q. Did you pack it in cans?

A. In liquid form? No sir.

Q. Then how did you know it settled in the can?

A. Well, we always make the experiment and we always mark the sample and date it and refer back to it, else you wouldn't
543 know anything about the experiment.

Q. Did you pack in cans? I asked you and you said no.

A. Yes, certainly we put it in cans and sealed it up.

Q. And when did you look after it?

A. Oh, three or four years after. The main fault I found — it, it didn't work freely.

Q. It didn't work freely under the brush?

A. Yes sir.

Q. Now in what combination did you use sublimed white lead?

A. Well, that is more than I can really state; I have tried it back and forth in all kinds of forms.

Q. Just tell me in what combination you used it?

A. Well, I used it in carbonate of lead and I used it in oxide of zinc.

Q. In what combinations, in what proportions?

A. In weights or grades or tints you mean? I don't understand quite.

Q. What percentage of sublimed white lead did you mix with carbonate of lead?

A. Oh, just about a third of each.

Q. And what was the other third?

A. Zinc.

Q. You used a combination of one third of sublimed white lead, one third carbonate of lead and one third oxide of zinc?

A. Yes sir.

Q. And from that combination you didn't get a proper result?

A. No sir.

Q. That is to say, it didn't flow freely under the brush?

A. No, that it exactly it.

Q. In what other combination did you use sublimed white lead?

A. I tried it straight, absolutely straight.

Q. Tried to use only sublimed white lead and linseed oil
544 and no other pigment?

A. Yes sir, no other pigment.

Q. In what other combination did you use it?

A. Well, I used it with zinc and lead; I mean sublimed lead and zinc.

Q. Sublimed white lead and oxide of zinc in what proportions?

A. About half and half?

Q. What other combination did you use it in?

A. Well, I ain't able to tell you all of them. If I had——

Q. Tell me other combinations in which you used sublimed white lead, if you remember any other?

A. Why, I have tried it in various proportions and I can't state exactly the proportion just now.

Q. You don't remember any other proportions?

A. No.

Q. When did you start the last experiment with sublimed white lead in mixed paint?

A. Well, I think it is a year ago since I tried it, the very last.
Q. A year ago?
A. Yes.
Q. What combination was it in then?
A. Well, that was about one third of each for that.
Q. Who did the painting of the board with this experimental sample of paint wherein you used sublimed white lead?
A. Myself.
Q. Explain the manner in which you ground together the sublimed lead, carbonate of lead and exide of zinc in the experimental sample which you made last?
A. Well, I weighed them out separately, of course, and I mixed them together.
Q. You ground each separately?
A. No, I ground them all together by mixing it. I mixed the zinc first and then I put in the sublimed white lead and
545 then the carbonate of lead and thinned it down after it was ground, of course, and then tried it.
Q. What was the quantity of mixed paint that you made in that sample in your last experiment?
A. Of the paste form, you mean?
Q. I am talking about mixed paint all the time, Mr. Joystad.
A. Yes, but you had to grind it into paste before you can thin it.
Q. How much of a quantity of mixed paint did you make up in your last experiment where you used sublimed white lead.
A. Oh, a very small proportion: I should judge, thinned, not over a gallon or so.
Q. Do you know to what degree of heat you subjected the sublimed white lead in the grinding?
A. I ground it in a water cooled mill: it couldn't get warm.
Q. What degree of heat do you get by grinding in a water cooled mill?
A. Well, that temperature wouldn't be high—I don't——
Q. Have you measured it?
A. Well, I haven't measured it; it wouldn't take more than lukewarm.
Q. Don't you know that by grinding sublimed white lead in a water cooled mill you will get at least 400 degrees of heat?
A. No, it ain't necessary to squeeze it that tight to get it: of course the pigment itself is fine.
Q. In the former experiment you made with sublimed white lead, did you make up the same quantity of mixed paint as you did in the last experiment?
A. Just about.
Q. About one gallon?
A. Just about one gallon.
Q. Or a little less?
A. Well, might be a very little over.
Q. About one gallon.
A. Yes.
546 Q. In all the various experiments?
A. Yes.

Q. Of course you have examined sublimed white lead in its dry form frequently?

A. Yes sir.

Q. I suppose the reason why sublimed white lead does not flow freely from the brush is that its particles are coarse?

A. No, it is fine, very fine.

Q. That is, in your opinion, an objection?

A. Yes sir.

Q. Why doesn't it work well under the brush?

A. Well, I don't know the reason why, but they don't do it.

Q. That is, in your experience, id doesn't do it?

A. No.

Q. I understood you to say, on your direct examination, Mr. Joystad, that you never used or tried sublimed white lead in liquid form, but only in paste form; did you say so?

A. No: if I did, I want that corrected. Of course, I have tried it in experiments. We never have sold it. Of course I want to tell the truth and nothing but the truth.

Q. Have you never found that carbonate of lead is liable to blacken under the influence of sulphur gases in the air?

A. Well, that is overcome by using the oxide of zinc to a great extent.

Q. Is it entirely overcome?

A. In most cases it is.

Q. Is it entirely and absolutely overcome?

—. ——.

A. Well, I have not asked you whether, in combination with oxide of zinc, the tendency of carbonate of lead to turn
547 black is diminished. I have asked you whether carbonate of lead alone, used in mixed paint, will not blacken when exposed to the influence of sulphur gases?

A. Well, I don't know if anybody turn out any strictly pure carbonate of lead in mixed paint.

Q. You know that there was a time when there was nothing else used but carbonate of lead, don't you?

A. That was not sold as mixed paint; that was mixed by the painter as he used it.

Q. You can't mix paint out of 100 per cent. of carbonate of lead, can you, and have good results?

A. No sir.

Q. Why not?

A. Well, just because of the very reason the question you set here before me.

Q. On account of its blackening tendency?

A. Yes sir.

Q. Is that the only reason?

A. That is about the only reason.

Q. Don't it harden in the can?

A. Well, it is necessary to put something else in so that it won't harden.

Q. But I have asked you about carbonate of lead as the only pigment?
A. Well, then it wouldn't give satisfaction.
Q. Now, the first reason why it wouldn't give satisfaction is that it has a tendency to blacken?
A. Yes sir.
Q. The second reason is that it would settle in the can and ger hard?
A. Yes sir.
Q. Doesn't it also have a tendency to crack and peel, chalk and flour?
A. That is true.
Q. Now, then, all these objections exist to carbonate of lead when used alone?
A. Used alone; only by union of the zinc will overcome it.
548 Q. I didn't ask you about how it can be overcome. I have asked you about the properties of carbonate of lead alone.
A. Well.
Q. Now, if you use oxide of zinc alone, will that give a good paint?
A. No sir.
Q. What is the matter with it?
A. It dries too hard.
Q. What happens?
A. Cracks.
Q. And peels?
A. Yes.
Q. Now, when paint chalks or flours, that means that particles of it will drop off; isn't that so?
A. Yes sir.
Q. And when it cracks and peels the same result will follow?
A. The same result will follow.
Q. Now, even if a combination of carbonate of lead and oxide of zinc, isn't there, in a lesser degree, a tendency to crack and peel and chalk after a few years?
A. No; if it peels it can't chalk.
Q. Well, what does it do then, doesn't it do any of those things?
A. Well, it will do one or the other.
Q. That will depend upon whether more carbonate of lead is put in or more oxide of zinc put in: isn't that right?
A. Yes sir.
Q. If there should be more carbonate of lead put in than oxide of zinc, it would chalk, would it?
A. Yes sir.
Q. And if there is more oxide of zinc put in than carbonate of lead, it would crack?
A. Yes sir, that is right.
549 Q. Now, in what proportion would you put carbonate of lead and oxide of zinc for the best results for outside paint, for outside white?
A. Well, that will vary a good deal in the climate.

Q. Such a climate as North Dakota has.

A. Well, I should think half and half would wear very well. Of course, I wouldn't say that for certain, but it seems to me that it should.

Q. How about Minnesota?

A. Well, I think Minnesota would stand a little more zinc.

Q. Why?

A. Because it has more dampness in the air.

Q. You mean that carbonate of lead is susceptible to the influence of moisture, is it?

A. Well, to salt water airs, it is.

Q. Well, have you got any salt water in the state of Minnesota?

A. No.

Q. Then why would you use less carbonate of lead in the state of Minnesota?

A. Well, that is a matter of opinion, you know, so I wouldn't state one way or the other, all a matter of opinion.

Q. Then you don't know of any good reason why for the state of Minnesota there should be more oxide of zinc used than in the state of North Dakota?

A. No, the reason should be to have the same effect as the moisture.

Q. Are not the climate of North Dakota and the climate of Minnesota about the same?

A. Well, something I don't know much about.

Q. You never have been in the state of North Dakota?

A. No, never have.

Q. You have never gone outside of St. Paul in a good many years?

550 A. No, I have lived right here in town.

Q. You haven't travelled extensively?

A. No.

Q. Have you traveled at all?

A. A trifle little, not much.

Q. Just a trifle in the neighboring towns of St. Paul?

A. Well, in Nebraska and Indiana and Illinois.

Q. Did you visit paint factories?

A. I have.

Q. Now, do you make a different class of paint for the state of Minnesota from what you do for the state of North Dakota?

A. No, make only one grade, one kind for all, and we find that gives elegant good satisfaction.

Q. And according to your opinion, then, fifty per cent. of oxide of zinc and fifty per cent. of carbonate of lead will produce the best result, so far as the combination between those two pigments are concerned?

A. Yes sir.

Q. I mean, for the present, whether this is a proper combination for an outside white?

A. It is a good one.

Q. Well, is it proper? Is it the best combination that you know of?

A. Well, I will state the same as before, that it is a matter of opinion.

Q. I am asking about your opinion.

A. Well, it is about as good as any of them.

Q. Do you buy the pigment for your factory?

A. No, I don't buy it, but I always do the testing and looking after it and get what I generally call for. It never has happened any other way.

Q. You use for your outside whites the first grade of Mineral Point Zinc, do you?

A. For outside, for all of them clear through.

551 Q. You don't use any New Jersey zinc at all?

A. No, not in the last couple of years I haven't.

Q. Now, what is the price of Mineral Point zinc, first grade?

A. Five and a quarter, if I recollect right. Of course, the price is up, you know, now.

Q. What is the price of carbonate of lead?

A. A little better than that, I don't really know; somewhere around the neighborhood of six cents.

Q. Isn't it as high as seven?

A. No sir.

Q. You don't know that there is a difference of nearly as mich as two cents between carbonate of lead and Mineral Point zinc? You don't know that?

A. No.

Q. You say it is not as large?

A. No, it isn't as large.

Q. Well, what would you say?

A Well, the market price I ain't posted in; I don't do the buying.

Q. Isn't it a fact that the price for the best Mineral Point zinc is only four and a half cents a pound?

A. If I recollect the quotation right——

Q. Well, you don't know much about the price?

A. Well, suppose we leave it that way.

Q. Yes, you don't know much about the price but at any rate you know that it is cheaper than carbonate of lead?

A. Yes sir.

Q. If the proper proportion for the best results is fifty per cent. of carbonate of lead and fifty per cent. of oxide of zinc, then if any paint manufacturer should put, say 70 per cent. of oxide of

552 zinc into his paint with thirty per cent. of carbonate of lead, what reason would he have for that?

A. Well, it looks like he is——

Q. Trying to cheat?

A. Trying to cheapen it, and I don't think he would make nearly as good paint.

Q. Now, when a man puts in more of a useful article than is proper to get the best result, and that article is the cheaper article, you call that adulteration, don't you?

A. No, I don't, if it can be proved to me to be otherwise.

Q. Let's see whether we understand each other, Mr. Joystad.

A. Well, that might be.

Q. Take an article, which up to a certain percentage may be used to good advantage, but if you use it beyond that percentage you have used too much of it.

A. Exactly.

Q. You have used more of it than was proper?

A. Yes.

Q. Now if that article of which you have used more than is proper is a cheaper article, you would call that then an adulteration would you not?

A. No, I wouldn't call it an adulteration; I would call it a cheapener.

Q. Well, if something is used for the purpose of cheapening and not for the purpose of making the paint better, you would call that adulteration unless you put it on the can?

A. Yes that is true.

Q. You would call it an adulteration then.

A. Yes.

Q. Of course, if you put on the can, on the label, just what you have put into the paint, then you cannot be guilty of adulte-
553 tion, of course.

A. No.

Q. But if you do not say on the label that you have put in more of a certain cheaper article than was proper to put in, that then is an adulteration?

A. Yes sir.

Q. In what states does your firm sell its mixed paints?

A. Minnesota, North Dakota, South Dakota, Montana, Wisconsin and Iowa.

Q. Now, Mr. Joystad, you stated that carbonate of lead, when used alone has serious objections which can be overcome by using another pigment with it; is that so?

A. Yes, that is what I stated.

Q. And the oxide of zinc when used alone has serious objections which can be overcome when used in connection with another pigment?

A. Yes sir.

Q. Now, if some other manufacturers than yourself have found a way to overcome what objections there may be to the use of sublimed white lead alone, you don't know about it?

A. No, I ain't posted on that secret.

Q. You are not posted on that subject, as to how it may be overcome?

A. No sir.

Q. If, as a matter of fact, there are paints on the market which give perfect satisfaction and which contain sublimed white lead, then that would show that some other manufacturers have found a way to overcome the objections to sublimed white lead?

A. Yes, if they have.

Q. Now, as far as zinc lead white is concerned, when have
554 you last experimented with that?

A. As a mixed paint we have never tried it; we have ground it in paste form for years.

Q. You never made an experiment with zinc lead white as an ingredient of mixed paint?

A. No. Mr. Blood wouldn't have it.

Q. The objections, then, which you stated to zinc lead white were objections which you found by experimenting with it in paste form?

A. Yes sir.

Q. One of those objections was that its whiteness is not perfect?

A. Yes sir.

Q. Now, would that be a valid objection if zinc lead white were used in any other shades but whites and light tints?

A. No, there would be no objection there.

Q. Another objection which you mentioned to-day is that it crystallized after a few years and this crystallization interferes with brushing?

A. That is so.

Q. Now, if you haven't let the paint stand in the can for a few years so that the crystallization hasn't yet formed, there would be no objection to it?

A. No, then there wouldn't be any objection to it.

Q. Then that objection would arise only where the paint is allowed to stand in the can for several years before it is opened?

A. That is the only place it would come in.

Q. What kind of carbonate of lead do you use, the globular or the crystalline? Or don't you know the difference? Do you know the difference?

A. Well, the difference between the new process and the old process.

555 Q. Well, do you ever use carbonate of lead of crystalline shape?

A. No.

Q. You only use the other kind?

A. Use what they call carbonate of lead, yes.

Q. Both are called carbonate of lead, but there is the globular and the crystalline. Now, you use only the one which is not crystalline; is that right?

A. Yes.

Q. Have you ever experimented with the crystalline carbonate of lead to see whether there is that same tendency to crystalline?

A. Please state what are the manufacturers' names, whether it is the new process *or* white lead or the old process white lead; then I understand it and can give a better answer to it.

Q. Then let us call it the new process white lead.

A. No, I always use the old. There I am right at home, when you get the manufacturers' names.

Q. You have never experimented with the new process lead?

A. Not for many years.

Q. Well, when did you last experiment with it?

A. Oh, about nine years ago.
Q. And was that crystalline?
A. Yes sir, used to put the crystal in it.
Q. And there you found some tendency to crystallization, didn't you?
A. Yes sir.
Q. And that made it objectionable so far as its working quality under the brush was concerned?
A. Yes, both in the grinding and in under the brush.
556 Q. You found that objection to exist in the crystalline or new process white lead just as much as in the zinc lead white?
A. Just about the same, not a great deal of difference.
Q. Now, how zinc lead white would act so far as the brushing is concerned, when it is properly made and when it is put into mixed paint, that you do not know, do you?
A. No.
Q. You only know about its properties in the form of paste?
A. That is all.
Q. And you don't feel qualified to speak about the qualities or properties of zinc lead white used in mixed paint?
A. No, I ain't; I wouldn't state any.
Q. Now, you use zinc lead white in your agricultural paints, don't you?
A. Yes sir.
Q. Some of these agricultural paints are the highest priced in the market, are they?
A. Oh, not always the case.
Q. I say some of them are.
A. Some of them are, yes.
Q. And you use zinc lead white in some of them, don't you?
A. Not always the case.
Q. In some of them?
A. In some of them, yes, sir.
Q. Some of those agricultural implement paints sell for more than white lead paste, don't they?
A. Well, in some——
Q. Some of them do.
A. Some of them do, yes sir.
Q. I understand you to say that you have purchased only price selected mineral point zinc?
A. Lately, yes sir.
Q. Have you formerly used the other grades too?
A. Yes sir.
557 Q. Now, the objection which you found to the other grades of Mineral Point zinc than the prime selected was that it does not work as well under the brush as paints made from carbonate of lead and oxide of zinc?
A. That is exactly right.
Q. Any other objection that you found to it?
A. To the zincs?

Q. To the lower grades of Mineral Point zinc?
A. No.
Q. If there is a method of overcoming that difficulty arising from the use of the lower grades of Mineral Point zinc, you are not acquainted with the method?
A. No, I am not.
Q. You would not say that there is not a method of overcoming that difficulty, would you?
A. No, I wouldn't say that.
Q. Have you compared, by tests and practical experiments, the durability of a paint containing the lower grades of western zinc with a paint containing the oxide of zinc? Have you made tests that enable you to compare the life of the one kind of paint with the life of the other kind of paint?
A. No, I have never made any experiments of that kind.
Q. Then you have not tested the lower grades of Mineral Point Zinc on the score of the durability of the paint?
A. No, I have not.
Q. Have you made such experiments with paint containing zinc lead white so far as durability is concerned?
A. Well, that is——
Q. Mixed paint, I mean.
A. Well, we haven't compared them nor experimented——
Q. Have you compared the durability of a paint containing zinc lead white with other paints?
A. Yes sir, I have.
Q. Haven't you found the durability of paints containing
558 zinc lead white rather high?
A. Well, it ain't just high. It don't hold its luster as well is the only fault I found with it.
Q. The fault you found is that it doesn't hold its luster as well.
A. Yes.
Q. That is a difficulty that can be overcome, is it not?
A. Well, I don't think that can be overcome.
Q. You don't know of any way by which it can be overcome?
A. No.
Q. But you will not say that there is not a way of overcoming it?
A. No, I will not say that. Of course, there might be. I don't know of any.
Q. You admit, don't you, Mr. Joystad, that there is something about paint manufacturing which you do not know?
A. There may be a few things; I don't doubt about that; and a few things I do know.
Q. Well, did you ever use lithophone as an ingredient of mixed paint, intended for a first coat?
A. No, I never have.
Q. And you have never experimented with it for the purpose of a first coat?
A. I never took enough stock in it.
Q. You have never experimented with it, have you?
A. No, not as a paint, only an enamel.

Q. Have you ever used lithophone as an ingredient of mixed paint intended for inside use?
A. No, I never have.
Q. Did you ever try lithophone as an ingredient of mixed paint intended as a floor paint?
A. No, I never have.
Q. From whom do you buy your lithophone?
559 A. Well, we don't buy a great deal of it.
Q. From whom do you buy it? I don't ask you whether you buy much or little.
A. From Fred Labanburg.
Q. Do you purchase it from anybody else?
A. No.
Q. He is not a manufacturer of lithophone, is he? He is just a jobber?
A. No, importer, I believe; he imports it, so he says; that is all I know about it.
Q. Do you know the composition of the lithophone that you buy?
A. Well, it is supposed to be——
Q. I don't ask you what it is supposed to be; I ask you what you know about it.
A. Well, of course, I don't only go by their statement; that is the only thing I can go by because I ain't a chemist.
Q. Have you not a chemist in your factory?
A. No sir.
Q. Then you have no way of finding out what is the composition of the lithophone that you use in your enamels?
A. Only what I go through myself; I know a trifle little about it.
Q. Are you a chemist yourself?
A. No, not exactly a chemist, but still I can analyze.
Q. Are you exactly a chemist?
A. No.
Q. You are not a chemist at all?
A. No, I ain't no chemist.
Q. Then what is the sense of saying you are not exactly a chemist? Is there any sense in it? Answer me.
A. No, I don't claim to be a chemist. I stated that once before.
560 Q. What is the description of the lithophone that you find on the packages in which you buy it?
A. There isn't any description on the package.
Q. Has it any special name?
A. It is marked "Lithophone," or sometimes it is marked "New Whate," what they call it. It goes under that name sometimes.
Q. Who is the manufacturer of it?
A. Well, it comes from England some place; who are the manufacturers, that is more than I can tell you.
Q. Then you don't use American Lithophone do you?
A. No.
—. And all of your experiments have been made with this English Lithophone?
A. Yes.

Q. You haven't experimented with American Lithophone at all?
A. No.
Q. You say you cannot depend upon the whiteness of lithophone?
A. Yes sir, that is what I stated.
Q. Look at this shade of green which I show you. Would the fact that you cannot depend upon the whiteness of lithophone prevent you from using it in that shade of green?
A. I should almost think so.
Q. Would it in this shade which is marked here "wine?"
A. No.
Q. Would it in the shade marked "vermilion?"
A. Well, it might be used there.
Q. It might be used there?
A. Yes.
Q. Would there be any objection on the score of its not being always the same white in this blue here?
A. It can be used there.
561 Q. How about the olive?
A. Well, you can use it there.
Q. How about the azure?
A. Well, it can be used there. The yellow, I think it will knock it out.
Q. Now, these twelve colors which you find on the card which I show you, all different, which ones would you say would prevent the use of lithophone?
A. I should think the yellow.
Q. Only the yellow, the cream yellow and the old ivory yellow?
A. Yes.
Q. When you say that lithophone cannot be used in connection with copper or lead, what do you mean, so far as the copper is concerned? Is copper a proper ingredient of any pigment used in mixed paint?
A. Not in mixed paint, in enamels.
Q. In enamels?
A. In enamels and also in carriage paints.
Q. In what color in enamel would copper be present?
A. Well, it would be in green, chrome of green is composed of copper, as far as I know.
Q. You are thinking of Paris green, aren't you?
A. Paris green; that is where I get mixed.
Q. Is Paris green used in any enamel paint?
A. Well, there might be a trace of it.
Q. A trace of it sometimes?
A. A trifle.
Q. It might accidentally stray there; is that what you mean?
A. Yes, as leads are in yellows.
Q. Now, is copper present in chrome green?
A. No.
Q. Isn't chrome green the color that you would use to produce green enamels?
A. Well, yes.

Q. And nobody would deliberately use Paris green for that
562 purpose?

A. No.

Q. Then really you don't know of any enamel in which copper would be used, do you?

A. No, I wouldn't.

Q. Then really you don't know of any enamel in which copper would be used, do you?

A. No, I wouldn't.

Q. Now, then, when you say that lithophone cannot be used to mix with lead, you mean it cannot be used to mix with carbonate of lead?

A. Carbonate of lead and also chrome yellows: they contain leads.

Q. Well, but the lead that is contained in the chrome yellows is carbonate of lead, isn't it?

A. Yes.

Q. Then what you mean is that lithophone will not mix well with carbonate of lead?

A. No.

Q. That is what you mean?

A. That is what I mean exactly.

Q. You will not say that lithophone cannot be used properly to mix with sulphate of lead, will you?

A. Well, on that I am not posted.

Q. Can lithophone be used to mix with Mineral Point Zinc?

A. I think it can.

Q. Now, that contains lead sulphate, does it not?

A. Yes, a small percentage.

Q. So that it can be used to mix with sulphate of lead, can it not?

A. I think so.

Q. Can lithophone be used to mix with zinc lead white?

A. Well, I think it can be used there; I never tried it and I think it can be used, and that is the reason why.

Q. Now, in a green enamel, is there any reason that you can tell us from your knowledge why lithophone cannot be used to make an excellent paint?

A. Well, I think it can.

563 Q. And the same would be true with reference to all other colors except cream and old ivory wherein lead occurs?

A. That would be the only two places.

Q. In all other shades of enamels than cream and old ivory, you could use lithophone to excellent advantage, couldn't you?

A. Well, I suppose you could.

Q. In these cheap enamels which you manufacture and in which you say you use lithophone, what do use as thinners?

A. Oh, different varnishes.

Q. And you are not particular in these cheap enamels, I suppose as to the grade of the varnish?

A. Well, that depends on the color that come that will answer your purpose. Of course, there have to be some toughness and to give rich colors.

Q. And, it being a cheap enamel, of course, you use a cheap varnish?

A. Yes sir.

Q. And in your high priced enamels you use the highest grades of varnish?

A. Highest grades of varnish we can possibly get for the purpose.

Q. Do you use benzine in your low-priced enamels?

A. Well, yes, to a certain extent, not very much.

Q. But you don't use any benzine in your high-class enamels?

A. No sir.

Q. Then*n* when you said in your direct examination that you cannot use lithophone for shades of mixed paint, that was not correct, was it?

A. Well, we never have used it.

Q. Well, but you will not say that it could not be?

A. No, I wouldn't say that.

564 Q. And you will not say that it could not be used to good advantage: you will not say that, will you?

A. Well, for light shades I would be afraid to send it out, for it would be liable to turn dark from lead paint.

Q. But *i*t shades other than light shades you would have no such objection, would you?

A. No, I will not.

Q. Have you made a test with a mixed paint consisting of carbonate of lead, oxide of zinc and a percentage of barytes?

A. I have.

Q. How much barytes did you put into that combination?

A. About ten per cent.

Q. What was the durability of that paint?

A. It was all right. It was al- right.

Q. What was the opacity of that paint?

A. Its opacity isn't quite as good as if you leave it out.

Q. Was there a less opacity tha*t* you thought there ou-t to be, less than a desirable degree of opacity?

A. Well, it is.

Q. How long ago did you make that experiment?

A. Oh, it is long ago; how many years I wouldn't say.

Q. Fifteen or twenty years ago?

A. Well, fifteen years ago anyway.

Q. Have you experimented similarly with using silica in mixed paint together with carbonate of lead and oxide of zinc?

A. No, I never tried silica.

Q. Did you ever try silicate of magnesia?

A. No.

Q. Did you ever try gypsum?

A. Yes sir.

Q. What percentage of gypsum did you put into the mixed paint?

565 A. Never tried it in mixed paint; I have tried it in paste form.

Q. Well, I asked you whether you tried it in mixed paint. Of course in paste paint you could not try the opacity because you could not apply it on the surface, could you?

A. No.

Q. Did you ever try an experiment by putting calcium carbonate into mixed paint containing carbonate of lead and oxide of zinc?

A. No, I never tried it.

Q. The only one of the Class B pigments which you did try was barytes?

A. Barytes.

Q. Did you ever try the other Class B pigments than barytes for any other purpose and in any other combination than I have mentioned?

A. Not in mixed paint. I have used them in other materials.

Q. You have then, no means of knowing what would be the result of using in mixed paint a percentage of silica or silicate of magnesia or calcium carbonate or gypsum?

A. Well, it would take out a certain proportion of the body, that is the only——

Q. I say, you have no way of determining what would be the result of using them in mixed paint?

A. No, because I have not tried it.

Q. Have you tried to brush over agricultural implements a paint containing barytes?

A. Well, I haven't tried it on agricultural implements; I have tried it on wood work around the factory, of course.

Q. I asked you whether you have tried it on agricultural implements?

A. No, I have not.

Q. The agricultural implement man is the one that uses
566 the paints containing barytes that you sell, does he not?

A. Well, to a certain extent, yes.

Q. Do you know of any trouble in the brushing out of that paint on agricultural implements?

A. No sir, I do not.

Q. Has any complaint ever reached you that it does's- brush well?

A. No sir.

Q. Now, you do use a barytes in paste paint, do you?

A. Yes sir.

Q. In what kind of paste paint?

A. Why, in different kinds of paste paint.

Q. Different shades and for different purposes?

A. Different purposes, certainly.

Q. Do you use it also in light colored paints, paste paints?

A. No, to a very slight extent.

Q. But in all your tints other than the very light ones?

A. Yes.

Q. Now, when you sell paste paint containing barytes, the painter adds the linseed oil to bring the paint to a proper consistency, to make it ready for use?

A. Certainly.

Q. Have you tried yourself how this paint, when properly thinned with linseed oil, works under the brush?

A. If it ain't an old production of it, it works very well.

Q. You don't in the newer productions yourself, do you?

A. No.

Q. So there is no difficulty in brushing that arises from the presence of barytes in paste paint after it is thinned with lin-

567 seed oil?

A. If it is made properly.

Q. If it is made properly ther- would be no difficulty in it?

A. There would be no difficulty in it what I know of.

Q. Now, then, I understand that you object to the use of barytes in appreciable quantities in white paints and in the very light shades of paint because, in your opinion, barytes has not sufficient opacity; is that correct?

A. That is exactly it.

Q. That is the only reason?

A. Falling short in that manner.

Q. And that is the only shortcoming that you know of?

A. That is the only shortcoming that I know of in barytes?

Q. You know that it is an indestructible body?

A. Yes sir.

Q. Permanent body?

A. Yes sir.

Q. It does not decompose?

A. No.

Q. And that is, on the other hand, quite an advantage, isn't it?

A. It is, in some cases, yes; for most cases.

Q. For protecting purposes that is a great advantage?

A. Yes sir, only falling short in the opaque part of it.

Q. Now, the opacity or hiding has to do with making a beautiful surface?

A. Yes sir.

Q. Covering up all the blemishes on the surface that is to be painted?

A. Yes sir.

Q. But hiding power has nothing to do with protecting the surface from the influence of the elements and from physical contact?

A. Well, it has to do, of course, with the durability.

Q. I say the hiding power has nothing to do with protecting the surface?

A. No.

Q. Now, do you regard the protection to be given to a sur-

568 face to be covered with paint as an important element?

A. I do.

Q. So that barytes is capable of performing a very important purpose in mixed paint so far as protecting the surface is concerned; isn't that so?

A. Protecting is all right, and falling short——

Q. I asked you about protecting. For the protecting purpose it is very good, isn't it?

A. Very good, yes.

Q. Now then, there are quite a number of shades of paint when you get into the darker shades of paint where the opacity is furnished by the coloring matter, isn't there?

A. Yes.

Q. And in such cases where sufficient opacity is furnished by the coloring matter, you have absolutely no objection to the use of barytes, have you?

A. No, not in them cases, no.

Q. And, on the contrary, you would say that the presence of barytes in such paint where sufficient opacity is furnished by the coloring material is rather an advantage by reason of the permanency of the body?

A. Well, it is about as good as any.

Q. Well, isn't it better than a good many?

A. Yes, better than a good many.

Q. Now, barytes is the only one of the Class B pigments which you have used in these darker chades, is that right?

A. Oh, I have used more barytes and really I prefer it to the balance of them.

Q. But you have not used silica or silicate of magnesia or gypsum or calcium carbonate for the same purpose for which you say you used barytes?

A. No, no.

Q. And you don't know how well they would work?

569 A. I don't think they would work as well.

Q. But you don't know how well they would work, do you?

A. No.

Q. You know that silica has great permanency, don't you?

A. Yes, and it is a good filler.

Q. Don't you know that silicate of magnesia has great permanency?

A. Yes, I think it has.

Q. Doesn't gypsum possess the quality of permanency?

A. It is far ahead of whiting.

Q. In permanency?

A. Yes sir.

Q. Take the color card which I show you and which is Exhibit A to the depositions in this case, and look at the last shade in the second column, marked "vermilion;" do you make that shade?

A. No, we don't make any dry colors.

Q. I am not speaking of the dry colors; I am speaking of the mixed paint of that color.

A. Yes sir.

Q. Do you make a mixed paint of that color?

A. Yes sir.

Q. How do you make it?

A. Well, make it from the dry material which we buy for that purpose.

Q. What do you use for that purpose, Mr. Joystad, what dry material do you use?

A. Well, what is known in the trade as permanent red.

Q. Now, this permanent red that you use contains all the way from 80 to 90 per cent. of barytes, does it not?

A. No, I don't think it contains it quite that bad.

Q. You don't know how much it contains, do you?

570 A. Not exactly, no.

Q. Have you ever heard of para nitra aniline dye?

A. Yes sir, I have.

Q. Do you use it?

A. Yes sir.

Q. Can you make this vermilion out of that dye?

A. Very close to it, I think.

Q. Now, if you should use that dye, what other pigment would you have to use in order to make a mixed paint of this shade of vermilion?

A. Well, that is most likely gypsum in there and a certain portion of China clay, whatever might be the base, that is more than I really know.

Q. How much of this pure dye, how large a percentage of the total pigment would this dye form?

A. Oh, it would be a very small percentage there.

Q. About five per cent.?

A. Oh, likely run from five and six.

Q. Then what would the balance be? Could you use carbonate of lead?

A. No, no.

Q. Could you use oxide of zinc?

A. Well you could use oxide of zinc, but you couldn't get the shade.

Q. Oh, that is the question; I am talking about the shade. Could you get the shade and use oxide of zinc?

A. No.

Q. Could you use zinc lead white?

A. No.

Q. Could you use zinc from western ores?

A. No.

Q. What would remain, only Class B pigments?

571 A. That is true, in that shade.

Q. Now, the manufacturer who sells to you this permanent red that you mention as a dye color has taken five to six per cent. of this para nitra aniline and has himself put the barytes or clay or silica or something else in it, hasn't he?

A. Yes sir.

Q. Now, you can do that just as well as the manufacturer of the dry color, can't you?

A. Well, we could.

Q. And a great many paint manufacturers do it themselves?

A. Yes.

Q. Now, the para nitra aniline is pure color, isn't it?

A. It is a pure color, very stable.

Q. It is a pure color, chemically pure?

A. Pure color, yes sir.

Q. This permanent red which contains this para nitra aniline and 94 or 95 per cent. of Class B pigments is, of course, not a pure color, is it?

A. No, I wouldn't look at it that way; it has a very good body and wears well.

Q. Now, in using this permanent red for the purpose of making this vermilion color, do you use any barytes?

A. No, we don't put in any.

Q. You find it already there in the permanent red?

A. Yes sir.

Q. Now, if you should use any of the statutory pigments or the Class A pigments, you sould at once modify the color, wouldn't you?

A. Certainly would; couldn't use it.

572 Q. And the more of any pigment that has coloring strength you put in, the lighter would become the shade?

A. Certainly would.

Q. So that, for a shade of vermilion slightly lighter, you could only use a very small percentage of pigment containing coloring strength?

A. Yes, and then you would ruin the appearance of it?

Q. Now, look at the color in the last column, under which you find the name "*crylight* green." That is made out of chrome green, is it not? That is, chrome green is the coloring material.

A. Chrome green and Prussian blue.

Q. Now, do you buy that in its chemically pure condition?

A. No, buy it already made, in the dry state, you know.

Q. You buy it in a state where the manufacturer of the dry color has already doped the pure chrome green, is that right?

A. Yes sir.

Q. And in addition to the pure color, in the form in which you buy the dry color, is one or another or several of Class B pigments, isn't that right?

A. That is true. Its strength is in accordance to the price, of course, that you pay for it.

Q. Now, in making a mixed paint of the shade of this *crylight* green, you necessarily have got to use Class B pigments, haven't you?

A. That is true.

Q. You cannot use any pigment that has coloring strength?

A. No, not any body whatever.

Q. And when you speak of body, you mean coloring strength?

A. Coloring strength, yes.

573 Q. Now, is the same true of myrtle green, the color right below *crylight* green?

A. Well, of course, there is some other different coloring matter in there, whatever it might be.

Q. Well, can you use in that any pigment that has coloring strength?

A. No sir, you can't do it.

Q. Then you have got to use Class B pigments?

A. Compelled to.

Q. Now, this chrome green exists commercially in a pure condition does it not?

A. Yes sir.

Q. But you, rather than buy it in its pure condition and add the Class B pigments yourself, prefer to buy the dry color from the manufacturer who has already put in the Class B pigments with the chrome green; is that right?

A. Well, of course, we have them both, both chemically pure and commercial.

Q. When you have the chemically pure chrome green, you have got to put in yourself the Class B pigments?

A. Yes sir.

Q. You are compelled to: you cannot make the shade without it?

A. No, of course not; you couldn't do it; we are compelled to on that.

Q. Now Mr. Joystad, the same thing would be true, namely, the absolute necessity of using Class B pigments wherever you use a pure color which in itself has not got the density to give the proper consistency to mixed paint?

A. Well, I would say yes.

Q. Now then, the same thing would be true of the color called "bottle green" at the bottom of the first column in this color card?

A. Yes.

Q. And the same thing would be true of the golden olive, the last but one in the second column, would it?

A. Yes sir.

574 Q. And the same thing would be true of the Tuscon maroon, would it not, in the third column?

A. It certainly would.

Q. And the same thing would be true of the dark green in the last column?

A. Yes sir; it can't be helped.

Q. Now, you know, Mr. Joystad don't you, that ultramarine and carbonate of lead cannot be mixed together without the color being changed?

A. No sir, not satisfactorily, no.

Q. You know that that cannot be done, do you?

A. Yes, it can be done by zinc in it; not the lead alone, it can't be done.

Q. If you put carbonate of lead into your mixed paint and also put ultramarine in there, will not the shade of the ultramarine be changed?

A. Certainly.

Q. Is that an objection to the use of carbonate of lead in connection with ultramarine?

A. Well, that be an objection.

Q. That would be an objection?

A. Certainly.

Q. And you would not use carbonate of lead where you used ultramarine?

A. No.

Q. Then there would be left only oxide and zinc among the statutory pigments that you could use?
A. With ultramarine, yes.
Q. Now then, would that give a satisfactory paint if you had only ultramarine and oxide of zinc?
A. No.
Q. Then you would have to add something to give body, wouldn't you?
A. You would be compelled to.
Q. What would that other thing be?
A. Well, we can arrive at the coloring matter a different
575 way, you know, so that you don't have to use the ultramarine blue.
Q. Well, let us stay for the present on the ultramarine blue. If you use ultramarine blue and oxide of zinc and it does not give a proper paint, what other pigment would you use in connection therewith; could you use zinc lead white?
A. Well, it depends a good deal on the shade there again; if it was dark used, I suppose you could use it.
Q. How about sublimed white lead in that connection, could you use that in connection with oxide of zinc and ultramarine?
A. Yes, but then you wouldn't get the good working again.
Q. Could you use barytes?
A. No, barytes wouldn't help the body any, it would take away from the body.
Q. Could you use lithophone?
A. Well, I suppose you could use lithophone.
Q. Could you use zinc from western ores with a high degree of lead sulphate so as to give a proper amount of lead?
A. No, I don't think it would.
Q. Then in your opinion, ultramarine would not be used?
A. That is right.
Q. Now you condemn ultramarine because it cannot be used with carbonate of lead?
A. Well, you can by using zinc; then it w-uldn't have any bad effect.
Q. But you tell us that by using oxide of zinc and ultramarine you don't get a good paint?
A. No, don't get good body, no.
Q. That is, the oxide of zinc alone doesn't help?
A. No.
576 Q. Then what will you use?
A. Well, leave the blue out.
Q. That is to say, then you wouldn't use ultramarine blue?
A. Yes sir.
Q. Isn't ultramarine blue the most permanent blue known today?
A. For heat it is, yes sir.
Q. You mean it is the most permanent under the effect of sunshine?
A. Sunlight or any other heat.

Q. Now, paints are subjected to the effect of sunlight, are they not, when used on the outside?

A. Certainly.

Q. Isn't, therefore, ultramarine a very useful and important blue pigment when used on the outside?

A. It is a fact.

Q. Then you wouldn't condemn it altogether?

A. Oh my, no.

Q. You use it yourself, don't you?

A. I use it myself, yes.

Q. Then what do you use in connection with ultramarine blue and oxide of zinc in the paints where you use the ultramarine blue?

A. Well, by combining two together, not any more than half and half, they wouldn't have any effect at all on it. It is not always the case that carbonate of lead has effect on ultramarine blue when it ain't used clear. If it is used clear it is liable to ruin it at any time and its connection with zinc would help it along so that it could be used.

Q. I suppose it would help it along but would not carbonate of lead, even if mixed with oxide of zinc, effect the shade of the blue?

A. Very, very trifle.

Q. According to your experience, that would be a trifle?

A. A very trifle.

Q. Isn't ultramarine the only blue that you can use for
577 the purpose of producing certain shades of blue?

A. Well, it is and it ain't. Cobalt can be used, as good or better article.

Q. Isn't cobalt of the same chemical composition and doesn't it present the same difficulty as ultramarine when it is combined with carbonate of lead?

A. No, it hasn't got as much effect on it, not to my knowledge.

Q. Can you, by using Prussian blue or any other blue, produce the same shades that can be produced by ultramarine blue?

A. No, not identical, no.

Q. Now, in the very light blues, for instance, the turquoise blue that I show you here in the last but one column this color card, wouldn't the carbonate of lead, if mixed with oxide of zinc, half and half, effect the shades of the blue?

A. No, I don't think so.

Q. Do you know the signature of Mr. Blood, the head of the firm of T. L. Blood & Company?

A. I do.

Q. Will you state whether this is his signature on the letter which I now show you?

A. Yes, that looks like his handwriting.

—. Well, is it not?

A. Yes it is.

Q. Now, Mr. Blood, in this letter dated St. Paul, Minn., December 16, 1905, and addressed to Mr. E. W. Heath, Chairman, Chicago, Ill., says: "Dear Sir: Teplying to your favor of the 14th inst., we

very willingly join in the proposed legal proceedings in North Dakota in opposition to their new paint law, and earnestly hope for a favorable outcome." Is that right? Does Mr. Blood say so?

578 Mr. WATSON: Objected to as incompetent, irrelevant and immaterial, the witness having already verified the signature.

A. Well, he has changed his mind since, I think.
Q. Well, he has said so in this letter?
A. Well, according to the signature there, yes, that is his.
Q. Well, do you know what made him change his mind? Do you know? Yes or no to that.
A. Well, I think I do, yes.
Q. Wasn't it because Mr. Blood figured out that if he changed his mind and would conform to the specifications of the North Dakota law that he would gain an advantage in the sale of his mixed paints and other paints in the State of North Dakota as against other manufacturers who would make this fight?
A. No, I don't think so; he ain't that kind of a man.

Further proceedings were here adjourned until three o'clock in the afternoon.

579 TUESDAY, *February* 6, 1906, 3:00 p. m.

BERGER M. JOYSTAD, recalled.

Redirect examination by Mr. WATSON:

Q. Mr. Joystad, in the test that you made of a mixed paint with sublimed white lead as one of the pigments, the test you made a year ago, have you examined that mixed paint with a view of discovering what its qualities are under the brush?
A. I have.
Q. What are its qualities in that respect?
A. I found it just the same as I did when I experimented with it years ago, the same trouble, won't work well.
Q. You have just been cross examined by Mr. Zeisler in regard to certain tints and color in the manufacture of mixed paints, and you stated that those shades and colors could not be produced by the use of statutory pigments, carbonate of lead and oxide of zinc?
A. Yes sir, I did.
Q. Will you tell us what percentage of the total output of mixed paint from the factory of Blood & Company is made up of those shades and colors of mixed paints in which you are not able to use the statutory pigments of carbonate of lead and oxide of zinc?

Mr. ZEISLER: Objected to as immaterial and irrelevant.

A. I don't think they will exceed 20 per cent.
Q. What proportion of those mixed paints thus prepared which are used or intended to be used exclusively for house work would be composed without the use of the statutory pigments as ingredients?

580 Mr. ZEISLER: Objected to as immaterial and irrelevant.

A. I don't think they will exceed ten per cent.

Q. What was the total output of the factory of Blood & Company when you came to it, 22 years ago?

A. It was very small, very small.

Q. Can you tell us about how many gallons of paint per year?

A. No, I don't recollect; it was very small, I know.

Q. Was it half as much as it is now?

A. No, it wasn't one fifth.

Q. Has the growth of the business of the Blood Paint Company been a uniform and steady growth, or has it been otherwise?

Q. It has been a steady growth right along for every year.

Q. Each year showing a larger output than the previous year, you mean?

A. Yes sir, except the time of the panic, you know, of course then nobody done any great amount; you know what years I refer to.

Q. '93 and '94.

A. Yes.

Q. Your output now, you say is above 100,000 gallons a year?

A. Above 100,000 gallons a year.

581 Recross-examination.

By Mr. ZEISLER:

Q. When you speak of the output of Blood & Company 22 years ago you refer to the output of mixed paint, is that correct?

A. Well, that is the only thing they are making at the time.

Q. 22 years ago mixed paint was just about being introduced in the market, wasn't it?

A. Well, you might say it was; still it had been in the market about 30 years.

Q. Well, up to 22 years ago there was a comparatively small amount of mixed paint put out by all the manufacturers?

A. Yes, that is true; that is true.

Q. How large was the output of mixed paint of Heath & Milligan at the time when you left them?

A. Well, I don't believe they exceeded over a hundred thousand gallons; I don't think so.

Q. You don't think it exceeded that?

A. No.

Q. And it now exceeds a half million gallons a year, doesn't it?

A. I don't know how much that is now, a big amount I guess. They have grown the same as we have.

Q. Well, you don't know as a fact that Heath & Milligan's output of mixed paint exceeds a million gallons a year?

A. No, I don't; I wouldn't make any statement what amount: I ain't posted.

Q. You don't claim that the increase in the mixed paint business of Blood & Company was greater than that of many other manufacturers of mixed paint?

A. No, no, I don't make that statement.

582 Q. The output of mixed paint of Blood & Company has increased with the general increase of the demand for mixed paint?

A. The same as all hones- houses; of course there are some I don't call that.

Q. As a matter of fact, compared with quite a good many mixed paint manufacturers of the United States, your house is rather small, isn't it?

A. Well, I don't know where we come in. We ain't the smallest and we ain't far from the largest.

Q. You say you are far from being the largest?

A. Yes, sir, I think.

Q. Did you say "we arn't far from the largest" or "we are far from the largest."

A. No, I don't say not far from the largest. I say we ain't the smallest and we ain't the largest.

Q. You mean you are far from being the smallest and far from being the largest?

A. Yes, that is the better way to put it.

583 Redirect examination.

By Mr. WATSON:

Q. Mr. Joystad, the general output of your factory in the form of paints for use are in the form either of mixed paints all ready to be used or in the form of paste paints, are they?

A. Yes, they are.

Q. How does the output of your factory in the matter of paste paints compare in quantity with the output as to mixed paints?

A. Well, the mixed paint would run ahead, I should think.

Q. About what would be the comparative figures for the two?

A. Well, I ain't——

Q. Well, as nearly as you could give it; two to one, or ten to one, or one half or whatever you say?

A. Two to one is about as fair as I can possibly put it.

Q. That is, two mixed paints to one of paste paint?

A. One of paste paint.

584 JAMES ROBERT COOK, Sworn.

Examined by Mr. WATSON:

Q. Where do you live, Mr. Cook?

A. In Minneapolis.

Q. What is your age?

A. My age is 66.

Q. What is your business?

A. Superintendent of the Minnesota Linseed Oil & Paint Company.

Q. How long have you held that position?

A. About 20 years; I have been with the company 24.

Q. What sort of work did you do with the company before you entered upon the duties of your present position?
A. I was traveling man, on the road.
Q. Selling their commodities?
A. Yes.
Q. Where is this concern located, at St. Paul?
A. Minneapolis.
Q. What is the business of the Minnesota Linseed Oil Company?
A. Well, it is the manufacture of mixed paint, linseed oil and specialties; paste paints and so on.
Q. How long has that company been engaged in this business?
A. Well, something over thirty years in the mixed paint business and oil business.
Q. It has been in the business then some time before your first connection with it?
A. Yes.
Q. The factory of this company is situated in Minneapolis, is it?
A. Yes.
Q. What is the annual output of this company of mixed paints in gallons?
585 A. Well, now, I haven't the figures so that I could tell but I did keep track of it up until a few years ago, they didn't seem to want me to keep books, didn't seem to want any one to know what we were doing.
Q. As nearly as you can estimate it, tell us what the output is?
A. The last year I kept track of it, there was over 3,000,000 gallons of mixed paint.
Q. Is the output greater or less at this time than it was when you last kept an account of it?
A. Well, I think it has increased as it has every year.
Q. How does its output compare with the output of the factory when you first became its superintendent, 22 years ago?
A. Well, it never got up to 50,000 gallons then.
Q. Has the increase during this series of 22 years been gradual, from year to year?
A. It has.
Q. There has been *no* sudden expansion in any particular year, but a gradual growth from year to year during the whole 22 years?
A. Well, you may say so, and still there was one or two years that was a little better than others and one or two years when it wasn't any better and then it took a start again. It was on account of the times, I think.
Q. What are your duties as superintendent of this company?
A. Various. In the first place, I test all the colors to my own satisfaction. They don't order anything without I say so. I make all sample cards; that is, I plan them, proof them and get them ready for the printer and the girls who make them. I make out all
586 the formulas for the paste paints and mixed paints. Otherwise I figure the formulas on everything we put out.
Q. Are you the officer of the company to whom is committed the

duty of determining the ingredients which shall be used in the preparation of mixed paints?

A. I am, with Mr. Ramsey's advice. Sometimes he won't let me use what I want to.

Q. Generally speaking, however, you are the one who has that matter in charge?

A. Yes, certainly, yes.

Q. Is the work of preparing these mixed paints at this time, and has it been during the entire period of 20 years, under your immediate personal supervision?

A. Well, it has grown so more year by year. When I first went in there I did the tinting, but I don't do any of it now, but there is not a color that I don't look at before it is sealed up.

Q. Have your duties as superintendent of this company, having charge of the matters to which we have now alluded, given you an acquaintance with the different substances and materials which are used as ingredients in the preparation of mixed paints and their value and stability for different purposes in the preparation of those paints?

A. I think so, as far as I want to know.

Q. You are, of course, acquainted with carbonate of lead as a pigment, are you?

A. Yes, sir.

Q. What qualities does that pigment possess giving it value in the preparation of mixed paint?

A. Hiding power, spreading, and the choice of painters in general, first class painters, I don't mean modern painters who have simply seen a shed painted and started out with the business.

587 Q. You are likewise acquainted with oxide of zinc, I suppose?

A. Yes, sir.

Q. As that term is used, it refers to zinc produced in New Jersey?

A. Yes, sir.

Q. What qualities does that pigment possess distinctive to itself?

A. Well, it partly helps hold the lead up and it partly overcomes it chalking, the lead chalking. Zinc alone, of course, hasn't the hiding power that lead has.

Q. How about its hardness?

A. It don't have the opacity or it doesn't hide blemishes as the lead will.

Q. But about its hardness, how about its hard qualities?

A. Oh, well, it is harder, dries harder.

Q. Do you consider either of those pigments, used alone, as making the most valuable mixed paint?

A. You mean for outside or in?

Q. Well, for outside.

A. No, not as valuable as mixed together.

Q. What will you say of the qualities of a mixed paint in which these two pigments, carbonate of lead and oxide of zinc, are used as the base. I mean as the only pigments.

A. I don't think we can get any better paint made, if we get good pure carbonate and pure zinc.

Q. Well, I don't refer to carbonate of lead and oxide of zinc that are chemically pure, but the articles that are commercially pure, in the sense in which that term is used.

A. Well, I don't know how pure they are; I think perhaps there might be something else in them from their natural make-up,
588 but I can tell you the brands we use and then you can get your own idea about how pure they are.

Q. Well, what brands do you use?

A. We use the Red Seal, St. Louis.

Q. For your carbonate?

A. For the carbonate of lead. We use the New Jersey XX zinc.

Q. That is a New Jersey zinc, of course?

A. Yes.

Q. Well, how do these brands stand in the commercial marts of the country as being chemically pure?

A. Well, they are considered so.

Q. Well, using the carbonate of lead and the oxide of zinc as you do use it in your factory, what will you say as to the qualities which are imparted to the paint by the use of these pigments?

Q. Well, it really makes the painter's paint; what suits the painter should suit everybody, if they know enough to put it on.

Q. Explain what you mean by that?

A. Well, a painter who knows how to spread paint will choose this, rather than other paint.

Q. Why will he choose this rather than other paint?

A. On account of its spreading evenly and smoothly and covering without showing streaks.

Q. What about its opacity or covering power, hiding power?

A. Well, it is very good. The more zinc you will put in, of course, the less opacity there is.

Q. What about its durability, both as to its body and also as to its hiding power?

A. I think it is all right.

Q. How does it stand exposure to atmospheric conditions?

589 A. It stands well, as far as I know.

Q. Are you able to name any other substance which, used as pigments, will produce as useful and valuable and durable a mixed paint for outside purposes as carbonate of lead and oxide of zinc?

A. There may be others, but I don't know.

Q. Well, you have been in the business for twenty years or more, haven't you?

A. Yes.

Q. You have been with a concern that has grown to be one with a very large output, haven't you?

A. Yes.

Q. Have you been trying to find out, during all these years, what are the pigments that are the most valuable and that will produce the most satisfactory paint?

A. All the change we have made is to change from poor zinc to

better. We never have tried anything else only the carbonate of lead and zinc oxide.

Q. Well, why haven't you tried the others?

A. We have tried them in different proportions until we thin- we have got it. Well it is according to the quality of the zinc, what proportion to use.

Q. You mean you have varied the percentage of oxide and carbonate in the preparation of your paints?

A. Yes.

Q. But I mean why haven't you used zincs from western ores or lithophone in the preparation of your mixed paint, using them as ingredients in lieu of or in connection with oxide of zinc and carbonate of lead?

A. Well, now, we think that we have got along as well using what we have that we haven't dared to risk anything else without a good deal of experimenting, which we haven't done.

590 Q. As the superintendent of a large factory with an annual output of more than 300,000 gallons of mixed paint, have you endeavored to keep posted on the value of other pigments, as they have been satisfactorily demonstrated in a scientific way?

A. Well, perhaps I have in a little way, but never tried it in our paints.

Q. Well, as a scientific proposition, have you or has your concern become satisfied that these other pigments which I have mentioned are satisfactory substitutes for or may be used to advantage in connection with lead and zinc?

Mr. ZEISLER: Objected to as leading and as incompetent because the witness has already stated that he has not used or tried to use them, and objected to further as being a cross examination of counsel's own witness.

Mr. STERN: And further because he asks what his concern could do, as apart from his own knowledge.

A. As far as zinc lead is concerned, I couldn't find any object in using it.

Q. Zinc lead white?

A. Yes; it would only weaken——

Q. Why wouldn't you find any object in using it?

A. Well, why I would want to use it would be to cheapen it a little. In using all lead and zinc, as the price has gone up as it has since we changed from ordinary zinc to good zinc, I wanted to put in about 20 per cent., but I wasn't allowed to. I thought we could not afford to make the paint the way we did for the money we were getting for it. I thought that 20 per cent. wouldn't particularly hurt it.

591 Q. You mean 20 per cent. of zinc lead white?

A. 20 per cent. of zinc lead white, because then we could only get about ten per cent. of sulphate of lead.

Q. Well, you never have used it, as a matter of fact, and don't use it now?

A. No, we never have used it and don't use it now: never had any of it.

Q. And you say if you did use it, it would only have been for the purpose of cheapening the cost of the paint?

Mr. Zeisler: Objected to as improper, being a cross examination of counsel's own witness, and leading.

A. Yes, that is all.
Q. You have not employed sublimed white lead?
A. No sir.
Q. Don't use it at all now?
A. No.
Q. Do you use zinc made from western ores?
A. No, not that I know of; we use New Jersey zinc.
Q. But the zinc which you get, it comes from New Jersey, does it?
A. Yes sir.
Q. And is technically known as oxide of zinc?
A. Yes sir.
Q. You don't even use the Mineral P-int Zinc?
A. Not at all.
Q. Do you use lithophone?
A. Not at all.
Q. Why don't you use lithophone?
A. Well, I have no use for it myself.
Q. Why not?
A. Well, I will tell you. We bought a few barrels for trial.
Q. When was that?
A. Oh, two or three years ago, probably three years ago.
592 Q. Did you make some tests with it?
A. Why, we tried it a little in some enamels and dryers and where they said we could use it, a certain per cent. of it.
Q. Well, what was the result of your trials with it in the manufacture of enamel paint?
A. Well, the result was I didn't want it in the factory. I thought it was a dangerous thing to have around the factory where there was so many men.
Q. Why was it dangerous?
A. Because there was so many things it wouldn't work well in, especially in chromes or lead.
Q. How about the character of the paint which was produced by its use?
A. Well, it might be all right if you were sure about grinding it up as a pigment to be used without mixing it with anything else; then it might *he* all right.
Q. It would be suitable for use in some of the colors, you say, but not in others; is that what I understand you?
A. No, I didn't want to use lead with it or chromes.
Q. In colors which you could produce in enamel paints which did not require the use either of lead or chrome, would you consider it satisfactory or did you find it satisfactory in your tests?
A. No, I didn't.
Q. Why wasn't it satisfactory there?
A. I couldn't depend on the color.

Q. In what particular was the color produced by it unsatisfactory?
A. Well, it seemed to change color. In the sunlight it would turn to a gray perhaps sometimes, and to bring it back in the shade it would turn back again partly.

593 Q. You found that as the result of your tests and examinations, did you?
A. Yes.
Q. Well, did you enter upon its use at all after you had made those experiments with it?
A. I did not.
Q. Neither in the enamel paint nor in any other kind of paint?
A. No sir.
Q. What ingredients in the way of pigments did you use in the preparation of enamel paint in your factory?
A. Green Seal zinc; and that should be in the factory for six months before it is used.
Q. That is the oxide of zinc, is it?
A. Yes, Greem Seal zinc.
Q. Whar will you say as to the qualities of the enamel paint which your factory produces with the use of the pigments which you have described that you do use?
A. Well, it seems to be satisfactory.
Q. Has it been found satisfactory to the trade with which your concern does business?

Mr. ZEISLER: Objected to as improper, immaterial and incompetent, calling for hearsay evidence.

A. Why, I think so.
Q. Has your production and output of enamel paint increased or decreased?
A. I think it is increasing.
Q. Increased in proportion to the increase of the total output of your factory?
A. Well, I couldn't say as to that; perhaps it is more; I couldn't say.

Q. You have seen work done by the use of this enamel
594 paint purchased of your factory.
A. Yes sir.
Q. Describe what its quality is as to a glossy finish, as to hardness, body, opacity, etc.
A. Well, it makes a very nice glossy finish. Some of the best painters up there use it and like it.
Q. Well, how about the finish you find; tell us about that; is it glossy or otherwise?
A. Why, it is glossy.
Q. A high or a low degree of gloss?
A. High degree of gloss.
Q. How about its opacity?
A. Well, that is not very good, because it is all zinc.
Q. How about its quality of durability or lack of durability?
A. I think it is very durable, as far as I know.

Q. If you used lithophone as the pigment in lieu of the oxide of zinc in the preparation of your enamel paint, would the cost of a gallon of the same, the other ingredients being the same be larger or smaller?

A. Well, really I don't know that I ever took that into consideration; I don't know that I ever figured the difference. We never tried to make but the one grade. I don't know but it might take more lithophone, perhaps, than it would zinc so that it would make up so that the cost might not be different, but I don't know. I could tell by figuring it up again but I couldn't say as to that.

Q. Then, as I understand it, your firm rejects lithophone as a pigment in the preparation of enamel paint, not because of the matter of cost but because in your judgment it does not produce so satisfactory a result?

A. That is right.

595 Q. You heard the testimony of Mr. Joystad this morning, did you?

A. Yes sir.

Q. You heard his cross examination by Mr. Zeisler in relation to the inability to produce certain colors, as the Tuscan reds, certain greens and others, with the use of the statutory pigments, did you?

A. Yes.

Q. And that, in the production of those mixed paints, it was necessary to employ some of the ingredients known as Class B pigments: you heard that testimony?

A. In making some of those colors?

Q. Yes sir. I say, you heard that testimony?

A. Well, I think perhaps I did.

Q. You understand what are the pigments described in Class B, do you?

A. Yes.

Q. Well, did you agree with Mr. Joystad that the colors mentioned by him in his cross examination could not be produced by the use of the statutory pigments?

A. Well, perhaps if I was making the colors I would know better. We don't make any colors so that I couldn't tell as to that. We buy them in their natural state, that is, already made, so that we don't make any colors.

Q. You don't analyze the coloring matter which you receive?

A. We do not. I only test their strength and durability; that is all.

Q. And you are not able to state what percentage, for instance, they could contain of barytes, silica or other ingredients of that kind?

A. Not at all.

596 Q. You know, however, the classes of mixed paints produced in your factory in which you do not employ zinc and carbonate of lead as the pigments, do you?

A. Certainly.

Q. And they are substantially these colors that were referred to by Mr. Joystad on the stand?

A. They are. Now I mean in our mixed paints that we are putting on the market.

Q. Yes, I understand that. Now, will you tell us what percentage of the total production of mixed paints coming out from your factory are composed of these colors in which you don't use the statutory pigments, lead and zinc?

A. Well, I have no figures for that; I might make a rough guess but I couldn't be positive.

Q. Give us your best estimate.

A. Well, all the colors, house and barn.

Q. Yes sir.

A. I should say probably from—I would give it a wide range—from 20 to 30 per cent.

Q. What proportion of those mixed paints prepared without the use of the pigments of carbonate of lead and oxide of zinc would represent the house paints or paints intended for use on the outside of houses?

A. Well, probably fifteen to twenty per cent.

Q. And the balance would be for barns and work of that sort?

A. Yes.

Mr. ZEISLER: Do you mean 15 or 20 per cent. of the 20 to 30 per cent. or 15 to 20 per cent. of the entire output of mixed paints?

A. Of the house colors, he asked.

Mr. ZEISLER: Yes, but I mean do you mean 15 or 20 per cent of the entire output of mixed paints?

597 A. Yes. If I was to say it over again, I would put it 15 per cent.; I don't think it would go much over that.

Q. And that remaining ten or fifteen per cent. would cover all the other uses, including barns?

A. Yes.

Q. In the preparation of mixed paints in your factory, does your firm use sulphate of barium, commonly known as barytes?

A. In our mixed paints?

Q. Yes.

A. I never use it.

Q. Why don't you use it?

A. There would be no object.

Q. If you did use it, for what would it be substituted?

Mr. ZEISLER: I object to that hypothetical question on the ground that it is immaterial, irrelevant and incompetent.

A. If I was using a good deal of zinc, I might use a little for to make up weight, so as to make my paint weigh as much as some one else's; otherwise I wouldn't want it.

Q. Would it impart any useful or valuable quality to the paint?

A. I don't think so.

Q. Would it be cheaper than that in lieu of which it was used?

A. Certainly it would be cheaper but I don't think it would make but very little difference in what per cent. you would want to use. I can't see any object in using it in mixed paint, only as to make

weight, and I don't think it would do paint any harm, not a small percentage.

Q. Well, would a small per cent. of it, even, impart any valuable or useful quality to the paint, in your opinion?

A. I don't think so.

598 Q. Well, then, what is your judgment would be the sole purpose of using it in the preparation of a mixed paint?

Mr. ZEISLER: Objected to because the witness has not shown himself competent to answer that question.

A. I never would use it in a mixed paint.

Q. Well, you wouldn't, but what would be the object of any one using it?

Mr. ZEISLER: Same objection.

A. Well, as I say, only as a make-weight.

Q. Do you use silica in the preparation of your mixed paints?

A. I do not.

Q. Why don't you use it?

A. Well, we haven't had any use for it. We don't try to cheapen it. We are trying to make the very best paint that we can make to suit a painter.

Q. Well, won't silica, when used in combination with the statutory pigments, produce a desirable result in the way of paint?

A. It has no covering quality, no hiding.

Q. Well, it has weight, hasn't it?

A. A little. If you use that you have got to leave out something else.

Q. It is cheap in price, is it?

A. Yes. Of course, it cheapens your paint by leaving out lead and zinc.

Q. You can't mention any useful quality which it would give the paint?

A. I cannot.

Q. Do you use silicate of magnesia?

A. I do not.

Q. Why don't you use that?

A. Well, for the same reason.

Q. It imparts no useful quality to the paint?

599 A. No, not so far as I know. I haven't had very much do do with it.

Q. Do you use calcium carbonate in the preparation of your mixed paint?

A. I do not.

Q. You understand what is included within that term, do you?

A. Well, now, you say mixed paints. This is house paints. We do use it in some of our mixed paints, in our barn paints, the calcium carbonate.

Q. That is, the reds, for instance?

A. Yes sir.

Q. But in the general classes of your mixed paints, making up

the 70 per cent. which you say may be prepared without the use of anything except the statutory pigments, you don't use it in any of those?

A. No sir.

Q. What are the common forms of calcium carbonate?

A. Well, English cliffstone is about as good a form as there is of it.

Q. Well, what are the other forms, or some of them?

A. Well, Paris white, whiting; I don't know what else.

Q. Is ground marble dust one of them?

A. Well, I shouldn't think so, but I don't know but what that is classed in there. That is for putty. I don't know whether that is classed in there or not.

Q. Does the use of calcium carbonate in any of its forms, in your judgment, impart any useful quality to the paint? I mean, now, in any of the mixed paints which can be produced by the use of the statutory pigments?

A. No, I don't think so.

600 Q. Do you use hydrated sulphate of lime in the preparation of your mixed paints?

A. I do not.

Q. Why don't you use it?

A. I don't know as I know anything about it. I haven't never had anything to do with it.

Q. Well, you know what it is, don't you?

A. I don't know as I know that just at present. I haven't had any use for anything of that kind.

601 Cross-examination.

By Mr. ZEISLER:

Q. While you were a traveling salesman, you had nothing to do with manufacturing paints, had you?

A. No sir.

Q. You didn't have any chance to become acquainted with the value of the various properties of the different pigments?

A. No sir.

Q. When*m* however, you left off traveling and went into the manufacturing department of your concern, you started in as superintendent?

A. Yes sir.

Q. Without having previously had any practical preparation for that position; is that right.

A. No sir; I had been a practical painter for 20 years before I commenced working for this company.

Q. You mean a job painter or journeyman painter?

A. Yes sir, contractor, worked for myself and employed from two to a dozen men.

Q. You never had manufactured paints at that time?

A. No sir.

Q. You had bought keg lead and tinted it yourself?

A. Yes sir.

Q. And at that time that was the common way for a job painter to do, wasn't it?

A. Yes sir.

Q. You bought keg lead, linseed oil and tinting matter and mixed them and produced the various shades?

A. That is right.

602 Q. So you never had anything to do with becoming acquainted with the different kinds of pigments that could possibly be used, whether useful or otherwise?

A. Well, perhaps not.

Q. When you were a job painter, you never had occasion to use zinc, did you?

A. Well, yes sir.

Q. In what shape?

A. Well, we would buy it sometimes for finishing coats inside, in paste form.

Q. But not for first coats and not for outside use; is that right?

A. Well, sometimes we would put a little in for outside use on the last coat, to give it a little more shine.

Q. Do you remember the time when there was considerable question as to the value of oxide of zinc for outside use?

A. I don't know that I remember any particular time when it was agitated.

Q. When did you first hear of oxide of zinc as a paint pigment?

A. Oh, I don't know. I used to buy it and use it in our business; I don't knoe how long ago, I am sure; probably 30 years anyway.

Q. Now, to use it on the outside, not in the last coat but in an under coat, would have been considered an adulteration in those days, would it not?

A. Well, I couldn't say as to that. I never used it for any first coat; always used lead; thought there was nothing better for priming coat than lead.

Q. That was what was generally supposed?

A. Yes, and thinned free; thinned with pure linseed oil.

Q. Of course you have changed your opinion about that since?

603 A. I don't think so, no.

Q. You still think that, for a first coat for outside use, lead alone should be used?

A. No, I think that lead with a little zinc will be all right.

Q. Well, just a little zinc in the first coat?

A. Yes, I think it would be all right. Still I don't know but I had just as soon have lead alone for the first coat, with a few drops of black.

Q. How much zinc do you think now is useful and proper to be used in connection with carbonate of lead for first coats on outside white?

A. Well, I don't know as it is necessary to have any, but if I had any I wouldn't have more than ten per cent.

Q. Well, what would you say about 20 per cent?

A. I don't think I would want as—Well, I don't know as that would hurt it particularly.

Q. How about thirty per cent. of oxide of zinc with 70 per cent. of carbonate of lead.

A. Well, for the first coat, if I was making it for myself—we don't make any specialties that way—but if I was making it for myself, I would rather have less zinc in it; I wouldn't want more than ten per cent.

Q. What would you regard as being the quality of that kind of a paint for first coat inside——

A. Not as good, not as good as one with ten per cent. in.

Q. You regard it then as defective?

A. Well, I don't know as I could say that.

Q. Then, if it is not defective, it is all right, isn't it?

604 A. It may be and it may not.

Q. You don't know?

A. I don't know as I have used it that way.

Q. Well, now, of course, you know that, while you might be very well pleased and tickled with your own paint, after all, that is not the standard for the entire world. At the same time I want to know what is your opinion as to whether a paint of that sort, containing 30 per cent. of oxide of zinc and 70 per cent. of carbonate of lead, used on the outside for a first coat, in a white paint, would be a satisfactory paint.

A. I think it would, with the present zinc we are using.

Q. Then what would you say about a combination of 40 per cent. of oxide of zinc with sixty per cent. of carbonate of lead?

A. I wouldn't say anything against it with the zinc we are now using.

Q. What would you say about a combination of 50 per cent. of oxide of zinc with 50 per cent. of carbonate of lead?

A. I would say it was all right.

Q. What would you say about a combination of 60 per cent. of oxide of zinc with 40 per cent. of carbonate of lead?

A. I wouldn't want any more.

Q. What would be the effect of using more than 50?

A. Well, it would be apt to crack and peel.

Q. Now, if you use 90 per cent. of carbonate of lead and only 10 per cent. of oxide of zinc, wouldn't the paint have a tendency to chalk or flour?

A. Well, it might; I don't know as it would with 10 per cent. of good Green Seal Zinc.

Q. Now, the fact of the matter is, you haven't really made

605 many practical tests and experiments, have you?

A. We used to years ago. I haven't since we have been in the factory.

Q. That is to say, you have made no practical tests *furing* the 20 years that you have been in the factory?

A. No sir.

Q. No exposing tests of any kind?

A. Not of that kind; only with the zinc we are now using. We

make tests right along every year with what we are using to get at the right proportion, which is the most durable.

Q. All those experiments that you have been making in the last 20 years have been with combinations of carbonate of lead and oxide of zinc, so as to arrive at the best proportion?

A. Yes sir.

Q. And you have made no other practical experiments and tests; is that right?

A. That is right.

Q. Have you ever made a practical test with a mixed paint containing a percentage of sublimed white lead and one or both of the statutory pigments?

A. I have not.

Q. What I mean, of course, by exposure test is the painting of some surface and expecting those surfaces either on the roof of your factory or at some other place where the elements, rain and atmospheric influences can work upon it. That is what I mean. Now, it is in that sense that you have understood the word when you said you have made no such tests?

A. Yes.

Q. You have made, then, no tests in the sense in which I have used the word, with paint containing any percentage of zinc lead white, have you?

A. No sir.

Q. Nor any tests with any paint containing any percentage
606 of zinc from western ores, carrying in its natural composition a certain amount of sulphate of lead?

A. When we were using those western ores, we made tests.

Q. How long is it since you ceased using them?

A. Why, it might be five years and it might be eight; I could not say exactly.

Q. Now, what were those tests that you did made with zinc from western ores?

A. Well, the proportion that we were using, say, we would paint a board and put it on the factory and nail it up there for such a length of time. Then we would can it in a can to see how it would work in the can after it had been there for a year or such a matter, we would open it and see how it stirred up and so on.

Q. When did you first begin to use zinc from western ores?

A. I couldn't say; they were using it when I went to the factory.

Q. Isn't it a fact that you continued to use it until two years ago?

Mr. WATSON: Five.

Mr. ZEISLER: I am asking: isn't it a fact that you continued to use it until two years ago. We have some analyses, Mr. Watson.

A. I don't think we have had it in the factory for two years.

Q. Within the last two years you don't think you had it in the factory?

A. No sir.

Q. Did you have it in the factory within two years and one month?

607 A. I don't think so.

Q. Did you have it in the factory within two and a half years?

A. I don't think so.

Q. You claim you didn't have it in the factory within the last five years; is that it?

A. I couldn't say positively, but I don't think we have had it in the last five years. I haven't got any figures; I don't know.

Q. When you did use the zinc from western ores, you used it in the place of the New Jersey zinc, is that right?

A. Yes sir.

Q. Altogether?

A. Altogether.

Q. So that, when you say that you made tests right along of various combinations of carbonate of lead and zinc, you meant that, until five years ago, all those tests were with combinations of carbonate of lead and zinc from western ores?

A. Yes sir.

Q. And since you ceased using zinc from western ores you have continued to make tests with a combination of carbonate of lead and oxide of zinc in its strict sense?

A. Yes sir.

Q. You have never made any tests with any paint containing lithophone, exposure tests?

A. No sir.

Q. You have never made any tests with white or light shaded mixed paints containing barytes?

A. No.

Q. You have never made a test with a combination of pigments containing silica?

A. No sir.

Q. Or silicate of magnesia?

A. No sir.

Q. Or calcium carbonate?

A. No sir.

Q. Or gypsum?

608 A. No sir. Now, let me correct one point there. The first year that we commenced using New Jersey zinc, it was so much better than the Mineral Point zinc that I wanted to use a little per cent. of calcium carbonate. I thought ten per cent. would not hurt it, and I did finally get them to consent to use ten per cent., and we used it one year. I want to make that straight so as not to say that I never used it.

Q. Now, during all the years from the time that you became the superintendent of your factory until you ceased to use zinc from western ores, of course, you made an inferior article?

A. Well, I think that we have been improving it ever since in using better zincs.

Q. You did make, then, a distinctly inferior article, did you not?

A. Well, I couldn't say. No, we made a very good article, I think

it would compare as well or better than the most of them that was made.

Q. You then contend that a good paint can be made by the combination of carbonate of lead and zinc from western ores?

A. Yes sir, if you have good oil.

Q. I am always assuming that all the other ingredients are good.

A. Yes sir.

Q. That is to say, the comparison is made upon the basis of all other things, so far as thinners are concerned, being equal.

A. Yes.

Q. You said that you had made some small quantities of enamel paints with a few barrels of lithophone that you purchased three or four years ago?

A. Yes.

Q. Where did you buy that lithophone?

609 A. I am not certain whether we got it of Heller & Hertz or J. W. Coulston.

Q. Do you mean what make it was?

A. Well, I tried several samples and it was the strongest and whitest of any I could find at that time.

Q. It was only one kind that you purchased?

A. That was all, only one kind.

Q. You cannot now state who the maker of it was?

A. I cannot.

Q. Of course, you are aware that there are five or six different kinds of lithophone on the market?

A. Yes sir.

Q. Lithophone, you said, did not, in your experience, work well with chromes or lead?

A. Yes sir.

Q. What was the trouble of it when used with Chromes?

A. Well, it would thicken up, it wouldn't spread; had all sorts of trouble. I found that out myself. The man that sold it to me afterwards told he meant to tell me that, but he didn't; I had to find it out myself.

Q. Did he tell you how you might have overcome that?

A. He didn't say anything about it, no sir, but he said the proper way to use it was a certain per cent. of zinc.

Q. He said the proper way to use it was to add a certain per cent. of zinc?

A. To use from 30 to 50 per cent. of zinc with it, it would be all right.

Q. He forgot to tell you that, or, at any rate, he omitted to tell you that?

A. He didn't tell me that I couldn't use lead or chromes with it.

Q. Did you afterwards try a combination between litho-

610 phone and zinc?

A. Well, I don't think I did, I think that I got rid of it——

Q. You got disgusted with it after that experiment and never tried it again?

A. No, I got rid of it the best way I could.

Q. You didn't know at that time that chrome contained lead, did you?

A. Well, I supposed—no, I don't know that I can—I wouldn't be positive of what their base was.

Q. You don't even now know that chromes contain lead, do you?

A. Well, I have been told that they do.

Q. But you didn't know that three or four years ago when you made these experiments with lithophone?

A. Yes sir, I knew it then.

Q. And you had not been told when you purchased lithophone and had not learned in any other way that lithophone could not be used in lead?

A. No sir. I had not been told that; I didn't know it until I tried it.

Q. You then found out that carbonate of lead and lithophone didn't get along well together?

A. Yes sir.

Q. Have you since learned that sulphate of lead and lithophone do get along together very nicely?

A. Well, that is from what I hear over the table; I haven't tried it myself.

Q. Well, you haven't really tried to keep informed on subjects of that sort, have you?

A. I have not tried to find out anything better, because I have been in favor of pure carbonate and oxide of zinc to make a good paint.

Q. You felt satisfied that you were making a good paint and therefore really didn't care about finding out any other pigments?

611 A. No sir, the increase of our business and free from the trouble we used to have years ago has caused us to let well enough alone.

Q. In other words, you did act upon the principles of letting well enough alone?

A. Yes sir.

Q. You were making a paint that found a ready sale and you thought it was a satisfactory paint and you didn't try to improve it?

A. No. Well, I wasn't allowed to try. I often would, but I wasn't allowed to.

Q. Mr. Ramsey stood in the way?

A. Yes sir.

Q. He is still more conservative than you are, is he?

A. Yes sir, he didn't want me to fool away my time with it.

Q. When you say that lithophone changed color, I suppose you mean that it changed color under the effect of light?

A. Yes.

Q. Did you try it for inside enamels.

A. Oh, I didn't try it at all only as I tried it in the mill there on

boards. I was painting on the wall, trying it to see how it would work.

Q. Well, did you expose it to the light?

A. Yes sir.

Q. I mean to the sunlight?

A. Yes sir, sunlight.

Q. And found it changed color?

A. Yes sir.

Q. You never tried it where it was not exposed to the sunlight?

A. Yes sir.

Q. You did try it?

A. Yes sir.

Q. I mean separately, where it had not yet been subjected to sunlight?

A. Yes sir.

Q. And there you found that it also had changed color?

A. Well, it didn't keep white; I don't know whether it was——

612 *W.* It didn't keep its whiteness quite fully?

A. No sir, not up equal with the zinc.

Q. Now, would that be any objection in any but a white enamel or light shade of enamel?

A. It might not if you were making an enamel that would not be changed by some painter to alter its tint that wouldn't know anything about its composition.

Q. I am talking now about mixed paint enamel, ready for use, such as the householder himself might use.

A. I don't want to use much of lithophone; I know very little about it.

Q. You don't consider yourself competent to judge as to how it might work under other conditions than those under which you have used it?

A. No sir.

Q. And in as much as you have used it only to a very slight extent, you are not prepared, Mr. Cook, to condemn lithophone as a useless or valueless pigment are you?

A. Well, from what I know about it, I wouldn't want to have it around my factory; if I had a factory of my own, I wouldn't have it in the shop.

Q. You mean that because workmen who are ignorant of its quarrelsomeness when used in connection with carbonate of lead might put it in combination with carbonate of lead and then mischief would arise?

A. Yes sir.

Q. That expresses the whole reason, does it?

A. Yes sir.

Q. If you should not have any carbonate of lead in your factory; if, for instance, you should become satisfied that zinc lead white or that sublimed white lead is better, in that case you wouldn't have any objection to having lithophone around in the factory, would you?

613 A. I couldn't tell until I had had it and used those——

Q. Or if you have such workmen only as you could entirely rely upon and as are fully informed of this tendency of lithophone not to agree with carbonate of lead, then you wouldn't be afraid to have it around?

A. There is always danger of somebody making a mistake.

Q. Then you wouldn't have it around because you would be afraid that somebody might make a mistake and put lithophone in with carbonate of lead?

A. Yes sir.

Q. What is the reason why Green Seal zinc must remain in the factory for six months before it is used in enamels?

A. It works very much better under the brush, spreads easier, better satisfaction.

Q. Doesn't it have, unless seasoned, a tendency to brush streaky in the enamel?

A. Unless seasoned.

Q. And also unless you use specially prepared varnishes, isn't that so?

A. I think perhaps it is if you use it fresh.

Q. Well, even if it is seasoned, unless you use a specially prepared varnish, will it not get streaky?

A. Well, when you give it agem we don't find that trouble.

Q. But you do find trouble unless you give it age?

A. Yes sir.

Q. Of course, not everybody has found that out?

A. Yes, well, we find it very much better.

Q. Now, of course, where you make an enamel even out of the best and out of thoroughly seasoned oxide of zinc, the paint

614 will lack opacity, will it not?

A. Yes sir.

Q. Now, isn't opacity a very important quality in an enamel paint?

A. Not necessarily so.

Q. Are not enamel paints used principally for ornamental purposes?

A. Yes sir.

Q. Well, isn't opacity one of the most important qualities of an ornamental paint?

A. We have had some painters say we have had too much body to it.

Q. Well, what some painters say, really we care very little about in this lawsuit.

A. We don't depend on the opacity of enamel to cover the goods the enamel goes over.

Q. What do you depend on?

A. It is coated up with other whites first.

Q. You use first coats of other white paint and then use the other zinc varnish combination only as a last coat; is that right?

A. Well, you might put on two coats.

Q. Or two coats.

A. The last two coats.

Q. You have never noticed any tendency on the part of carbonate of lead to blacken under the influence of sulphur gases in the air?

A. I have not.

Q. What you have heard here during this examination on that subject was entirely new to you, was it?

A. Yes sir. Oh, it will, I know, where they use lots of soft coal in a city, where you paint white I know it will grow dark that way.

Q. But you don't know that it will not get dark when it is exposed to sulphuretted hydrogen in manure piles or from outhouses; you don't know that, do you?

615 A. Well, that might be; I don't know anything about it.

Q. Returning to the combination between carbonate of lead and oxide of zinc; I understand you to say that you would regard it as decidedly harmful to use more than fifty per cent of oxide of zinc?

—. I think you could use more of the Mineral Point zinc than you could of the Green Seal zinc. It would be according to the quality of the zinc.

Q. You could use more of the Mineral Point zinc than of the oxide of zinc?

A. I think you could.

Q. Well, speaking of the oxide of zinc, now, the New Jersey product.

A. Yes.

Q. You couldn't use more than fifty per cent. of that to advantage, could you?

A. Well, I don't think it would be as good a paint; I think it would be more apt to crack.

Q. Now, what would be your judgment of a paint containing 70 per cent. of oxide of zinc and only thirty per cent. of carbonate of lead?

A. Well, I wouldn't want to risk that much in it, after all these years of experimenting back and forth.

Q. Now, carbonate of lead has a tendency to settle and harden in the can, hasn't it?

A. Why, not so very much, of course; it settles more or less.

Q. Isn't the suspension of the pigment in a can of mixed paint a very important quality?

A. Yes, for some reasons.

Q. Is it not a valuable thing to add a certain per centage of a light body like, for instance, silica or silicate of magnesia,

616 with carbonate of lead and oxide of zinc so as to help the suspension of the pigment in the can?

A. I don't think so.

Q. Mr. Ramsey, wouldn't sanction this, even if you did?

A. Well, I don't think so myself, as far as that is concerned.

Q. You wouldn't allow anything to go into the combination of pigments for the purpose of preventing settling in the can?

A. No sir.

Q. Have you tried it?
A. We haven't tried any silica.
Q. Have you tried silicate of magnesia?
A. No sir.
Q. Have you tried gypsum?
A. We haven't tried any of those in Class B to keep it from settling.
Q. Have you tried to put them into paints for any other purpose?
A. No, sir, only in Venetiam red.
Q. In Venetian red you do put them in?
A. We do.
Q. Which one?
A. Calcium carbonate.
Q. About 70 per cent of calcium carbonate and what is the other thirty per cent. made up of?
A. It is an oxide that costs between 7 and 8 cents a pound. It isn't ordinary Venetian red; that we don't use at all.
Q. And why do you use it?
A. Why do we?
Q. Why do you use the calcium carbonate there?
A. Well, because we have had better luck with that than any other; we never have had a complaint with it and we are selling hundreds of gallons right along.
Q. Why do you use calcium carbonate rather than carbonate of lead or oxide of zinc?
A. We can't use lead in Venetian red.
Q. Why not?
A. We can't use any of these statutory pigments in the
617 Venetian red.
Q. Why not?
A. You couldn't get the color.
Q. In Venetian red a color that is a good deal in demand?
A. Yes sir.
Q. I understood you to say that you disapproved of using calcium carbonate in gray paints?
A. Yes sir.
Q. To put it in would be, according to your idea, adulteration, would it?
A. Yes sir.
Q. Can you explain to me why you have it in your gray paint which was examined and analyzed by Prof. Ladd, as shown on page 590 of the bulletin which is in evidence in this case "Minnesota Linseed Oil & Paint Company, Minneapolis, Minn." Above that it says "Gray Mixed Paints." The analysis is: "Lead calculated as white lead 57.72, zinc oxide, 28.32; calcium carbonate, 7.77; color and undetermined 6.19."
A. Do you want to know how I account for it?
Q. Why did you put it in when you say that it is an adulteration to put it in?
A. Well, sir, I will tell you how that came in. It came in when

we stopped using—That might have been a can that was taken off the shelf out of that year's lot when I told you we put in 10 per cent., after we stopped putting in Mineral Point zinc, we put in 10 per cent. for the purpose of evening up the price.

Q. Then you did it for the purpose of cheapening it, did you?

A. Yes sir.

Q. And you did it deliberately adulterating?

A. Yes sir.

618 Q. You think that any dealer in the state of North Dakota or, rather, in the city of Fargo where Mr. Ladd got his samples presumably, round so little use for your gray mixed paint that he had one of your cans of this paint on his shelves for several years?

A. I couldn't say as to that; it might have been a color that has not been called for.

Q. Can you account for the fact that in this same sample of paint the analysis shows that you use ten per cent. of naphtha in the fluid portion?

A. Well, probably it was there.

Q. Why did you put it in?

A. Well, we used to use it, years ago, we though it was better than turpentine.

Q. You thought it was better?

A. Yes.

Q. You also knew that it was cheaper?

A. Yes sir.

Q. You have ceased to think that it is as good as other thinners, have you?

A. I have not ceased to think so in paint that is canned up; it keeps it from getting fatty. It may give better general satisfaction to have it in, but the prejudice has been so great that we put it out altogether.

Q. You pay a great deal of attention to the prejudice of people in regard to what should go into paint?

A. Well, I try to suit the people, try to suit painters.

Q. Well, you try to avoid running up against prejudices, isn't that so?

A. Well, I try to make a paint that will be purely satisfactory.

Q. Satisfactory in its working quality or satisfactory as satisfying the prejudices of people?

A. No, its working quality.

Q. You pay no attention to the prejudices of people?

619 A. Certainly, some.

Q. Why don't you admit it and save me asking you fifteen questions?

A. Haven't I just admitted it?

Q. You have admitted it after fifteen questions on the subject.

A. Your questions are so many a man keeps busy answering them.

Q. The man only wants to be frank and answer a question as it is put and then he will avoid having fifteen questions put to him in order to worm out the true answer.

A. Yes, sir.

Q. I understood you to say that you never had purchased zinc lead white in the last 20 years.

A. No, sir, not that I know of.

Q. And you never purchased sublimed white lead?

A. Not that I know of.

Q. Would you have known it if it had been used in any of your paints?

A. I wouldn't be positive as to that. I don't know, I might possibly have ordered five barrels, I couldn't say. Mr. Evans sent us one barrel for trial, wanted me to try it; I don't know whether we ever purchased any of it or not; I couldn't say as to that.

Q. I have here, Mr. Cook, an analysis of an outside white, made by your concern in May, 1905, which shows the following composition: "Carbonate of lead, 33.73; oxide of zinc 49.72; sulphate of lead 14.05 and oxide of lead 2.50." I will ask you what the presence of fourteen and a fraction per cent. of sulphate of lead and two and a half per cent. of oxide of lead would indicate to you as to the ingredients used in that paint?

620 Mr. WATSON: I object to that as assuming, in the first place, that the alleged analysis was in fact made from one of the mixed paints produced by the Minnesota Linseed Oil Company, there being no proof of such fact.

Mr. ZEISLER: We can only prove our case step by step and we will connect with this question.

A. I couldn't understand that question anyway.

(The question was read.)

Q. Would that not be sublimed white lead?

A. I don't know where that formula came from.

Q. Do you know the composition of sublimed white lead? You can say yes or no to that.

A. Well, it is a lead sulphate, I suppose, sulphate of lead.

Q. You mean altogether sulphate of lead?

A. I don't know.

Q. What else does it contain but sulphate of lead?

A. I don't know.

Q. Then you really don't know anything at all about the combination of sublimed white lead?

A. I don't know much about it, no, sir.

Q. Is it not a fact that you did use more than one barrel of sublimed white lead and used at least five barrels of sublimed white lead during the year 1905, in the making up of your paints?

A. No, sir.

Q. Didn't you use quite a number of barrels of sublimed white lead in 1903 and 1904?

A. I don't think so. If we did have it ordered at all and had it on hand, we might have got rid of it somewhere.

621 Q. By using it in your paints?

A. But not in any mixed paints, no, sir, not unless it was a specialty.

Q. Didn't you buy, not long ago, 20 barrels of sublimed white lead which, since this agitation in North Dakota has come up, you have been trying to get the Picher Lead Company to take back from you?

A. No, sir. There was 20 barrels left there by somebody, I don't know who, and wanted us to use it if we could, but we haven't bought it.

Q. I show you this letter, written on the letter heads of the Minnesota Linseed Oil & Paint Company, dated April 10th, 1905: whose signature do you find on that letter?

A. Well, sir, that is——

Q. Answer my question.

A. That is Mr. Ramsey's.

Q. That is the only question I have asked you.

A. All right sir; I haven't——

Q. Have you read this letter through?

A. I have.

Q. I will now ask you whether this refreshes your recollection as to your having taken 20 barrels of Picher lead or, rather, sublimed white lead manufactured by the Picher Lead Company.

A. We took it to hold there but we never bought it, only, if we could make any use of it, why we were to pay them for what we used, but we never bought it, never ordered it.

Q. Have you used any of it?

A. No, sir.

Q. It is still there?

A. It is still there. Somebody wrote to him to get him to take this——

Q. Now, Mr. Cook, will you please wait until any question is asked you. Now, one month following the date of this letter,
622 namely, May, 1905, will you state positively that no mixed paint was made in your factory containing sublimed white lead?

A. I will tell you what was made——

Q. You answer my questions, Mr. Cook, please. Will you say positively that no mixed paint was made in your factory——

A. No, sir, I will not.

Q. Have you used benzine to the extent of fifty per cent. of all the volatile oil in your outside white?

Mr. WATSON: I object to that for the reason that only the pigments mentioned in Classes A and B are the subject of this investigation and the question is therefore irrelevant and immaterial.

Mr. ZEISLER: I desire to say that the witness's pretenses of orthodoxy are pretenses and that he sophisticates his paints by the use of benzine in outrageously large quantities in order to counteract the increased cost of pigments resulting from his now using only statutory pigments.

A. No, sir.

Q. Is it not a fact, Mr. Cook, that, in your outside white made within a half year, 66.2 per cent. of all the volatile oil was benzine?

Mr. WATSON: I object to that on the grounds aforesaid and also because it is not proper cross examination.

A. No, sir.

Q. In a can of your gray paint purchased two weeks ago and analyzed since then 49.7 per cent. of carbonate of lead, 48 per cent. of oxide of zinc and 2.1 per cent. of sulphate of lead was
623 found. Would that not indicate that, after all, you have recently been using zinc from western ores?

A. No, sir.

Q. How do you account for the presence of 2.1 per cent. of sulphate of lead?

A. I don't unless it came in the barrels that we bought for pure.

Q. In this same sample there was found 9.9 per cent. of the entire fluid to be water.

A. No, sir.

Q. How do you account for that?

A. No, sir, there hasn't been a drop of water for years in our paint, put in it, not by ourselves.

Q. If it was found in a sealed can, with your label, you think somebody else had been putting water in it?

A. Well, we never put it in.

Q. I will ask you to look at this paper which I show you. Is this written on the letter heads of the Minnesota Linseed Oil & Paint Company?

A. I think it is.

Q. Does it bear the signature of the president of the company, Mr. Ramsey?

A. I think it does.

Q. Now, does it read as follows: "Dated Jan. 5, 1906, E. W. Heath, Esq., President Heath & Milligan Mfg. Co., Chicago, Ill. Dear Sir: Yours of the 2nd inst., duly received, also copy of the bill filed by your committee at Fargo on January 2nd. I have perused the same very carefully and certainly have no criticisms to offer. In my opinion it covers the ground very thoroughly. Very truly yours, W. A. Ramsey."

A. That looks all right.

Mr. WATSON: I move to strike out the same as utterly immaterial, irrelevant, not going to say of the issues on trial in this lawsuit and not rebutting or attempting to rebut or lay any founda-
624 tion for rebuttal of this witness.

Mr. ZEISLER: The testimony, I contend, is relevant and material and taken for the reason that the witness has stated that Mr. Ramsey, his superior, is even more conservative than he, the witness, and has given the impression that Mr. Ramsey is not in sympathy and does not find himself in harmony with the statements in paragraph 17 and subparagraphs *a* and *b* of the bill of complaint in this case.

Q. I will show you another letter and will ask you whether this is written on the letter head of the Minnesota Linseed Oil & Paint Company.

A. That looks like it, yes, sir.

Q. Is that the signature of Mr. Ramsey, the president?

A. I should say it was.

Q. Now, isn't this letter dated December 29th, 1905, and reads as follows: "Mr. Ernest W. Heath, Chairman, President Heath & Milligan Manufacturing Company, Chicago, Ills. Dear Sir: We are in receipt of circular letter of the 26th inst., issued by your legislative committee, and in compliance with the request therein we enclose check payable to the order of S. L. Sulzberger, Treasurer, for $175, being one-half of amount of our contribution towards the fund voted your Committee by the Association November 14th. Kindly acknowledge and oblige, Yours very truly, W. A. Ramsey, President."

A. I should say that was genuine.

Q. Did Mr. Ramsey speak to you about this matter at all?

A. No, sir.

Q. You didn't know until now that Mr. Ramsey had con-
625 tributed money towards the expenses of fighting the North Dakota law?

A. No, sir.

Q. You have a paint law in the state of Minnesota, haven't you?

A. Well, I have heard we have; I don't know anything about it.

Q. And this Minnesota paint law specifies the same ingredients which the North Dakota statute specified?

Mr. WATSON: I object to that as immaterial and irrelevant.

A. I don't know what it specified; I have never read it.

Q. I will ask you whether this paper which I show you is a letter written on the letter head of the Minnesota Linseed Oil & Paint Company.

A. It looks like it, yes, sir.

Q. Will you say that it is?

A. Why, I think it is, so far as I know.

Q. It is a letter signed by whom?

A. It looks like Mr. Ramsey's signature.

Q. Will you say that it is?

A. I should say it was, to the best of my knowledge.

Q. This letter is dated December 2nd, 1903, and is addressed to R. W. Evans, Treasurer of the Picher Lead Company, Tacoma Building, Chicago. "Dear Sir: Yours first received. Sorry you cannot run up here as intended, as we should like very much to see you at any time, but we do not believe the prospect for our using sublimed lead is very good, as the Minnesota law is against it and
626 we often are compelled to hold up our hands and state that there is no sublimed lead in our goods. We have no doubt you have improved the quality of the goods and that they will work all right in many places, but you see our position in the matter and until conditions change hereabouts we do not believe that we care to do much of anything with it. Awaiting your further favors, we remain Yours truly, W. A. Ramsey, President."

A. I should think that was all right.

627 Redirect examination.

By Mr. WATSON:

Q. How long ago was it you ceased using calcium carbonate as an ingredient of your general line of mixed paints?

Mr. ZEISLER: Objected to. The witness never has stated that he used it in his general line of mixed paints.

A. I ceased using it in our house paints some time last fall; we are still using it in our barn paint.

Q. Have you the letter of the Picher Lead Company to which Mr. Ramsey's letter of April 10th, 1905, is an answer?

A. No, I haven't the letter.

Q. Have you seen the letter to which this is an answer?

A. I don't know that I have. I can *do* on and state some other things about that, if I am allowed to.

Q. You may state the circumstances and conditions under which the 20 barrels of sublimed white lead come into your factory in 1905.

A. Well, Mr. Ramsey asked me, called me down in the office and asked me if we could do anything with 20 barrels of sublimed white lead, that there was a party wanted to leave it there. Well, I told him, let him leave it there and if we could use it we would pay for it, otherwise I wouldn't buy it; and he said that he was just going to leave it there for our disposal, if we could dispose of it. That is my understanding of it.

Q. Now, have you employed it or used it in the manufacture of your paints?

A. Not that I know of.

Q. If any of it has been thus employed, it has been without your knowledge?

628 A. If any has been used, it has been from some of that that we ordered, either that barrel or that five barrels, if we ordered five barrels, I don't recollect what we did order.

Q. Has any of this 20 barrels been used?

A. No, none of that 20 barrels has been used.

Q. It is still in your warehouse?

A. It is still in the warehouse in our factory.

Q. Have the barrels been opened?

A. No sir.

Q. Are they in the same condition in which they were when you received them?

A. Yes sir.

Q. When was this one barrel or five barrels bought by your company?

A. Well, I couldn't say just that; I don't know anything about the dates.

Q. About how long ago was it, do you judge?

A. Oh, I should judge probably three years ago, perhaps, more or less.

Q. You bought that from Mr. Evans, I think you said?

A. I think so.

Q. Is th-t the Mr. Evans who was present here in the court room?

A. The only barrel; I didn't know that he ordered it; afterwards I think Mr. Evans told me he did; Mr. Ramsey said he didn't order it. Mr. Evans said he was going to send it up to me gratis to give it a fair trial, and I said I would and——

Q. Is that the Mr. Evans who sits in the room here, this gentleman here?

A. Yes sir.

Q. He is the agent for the Picher Company?

A. I think so.

629 Q. Now, what use did you make of this barrel or five barrels, whatever it may have been, that you received a few years ago?

Q. Well, part of it went into some paint in a formula that he sent to us that he had sold to somebody and he wanted us to grind it up for that party and send it to that party as according to his order.

Q. According to Mr. Evans' order?

A. Yes sir, we didn't get the order, we didn't take the order or have anything to do with it. It was an order that he received and we filled it out for him, as far as I know.

Q. Well, you did grind it up in oil in your factory, did you?

A. Yes sir.

Q. This one barrel or five barrels?

A. We ground up enough to fill his order, now, I don't remember what that was.

Q. Do you know what was done with the balance of it, if there was a balance?

A. Well, if it is disposed of, I am not certain if it is all gone *yet* or not, but whenever we could get any paste goods or where I thought we could use it, why, I told them to go ahead and get rid of it little by little until it was gone.

Q. Is that the only sublimed lead, the one barrel or five barrels, which you say came in that way, which you ever had in your factory?

A. It is all that I know anything about.

Q. Do you know whether Mr. Ramsey was requested and urged to permit the use of the name of his company as one of the complainants in this suit?

A. No, I don't know anything about it.

Q. Well, did Mr. Ramsey tell you that he was entirely willing you should go upon the stand as a witness on behalf of the defendant?

630 Mr. ZEISLER: Objected to as not material, relevant, competent or bearing upon any of the issues that have been cross examined upon the cross examination.

A. Yes sir.

631 FRIDAY, *February* 16, 1906—10.00 a. m.

Pursuant to stipulation of counsel, all parties met at the office of Sigmund Zeisler in the First National Bank Building, Chicago, Illinois, and the following proceedings were had:

MAXIMILIAM TOCH, Recalled on behalf of Complainants.

Examined by Mr. ZEISLER:

Q. State your full name.
A. Maximilian Toch.
Q. Are you the same Maximilian Toch who testified in this case, on the complainants' direct case?
A. Yes sir.
Q. And you have been sworn heretofore?
A. Yes sir.
Q. Prof. Ladd, in his testimony in this case, speaking of the properties of carbonate of lead, testified that one of the constituents of carbonate of lead combined with oil to form lead linoleate which makes an elastic and tough body that gives to the paint much of its valuable property of protecting. Please state whether Prof. Ladd's statement in that regard is correct.
A. It is not correct.
Q. What is your opinion on that subject?
A. The combinations between lead hydrate and the acids of linseed oil are very unstable and easily dissociated by water.
Q. There is a combination is there not?
A. Yes sir.
Q. But you do not regard that combination as an advantage or as giving any valuable property?
A. No sir.
Q. You said something about the effect of water; please enlarge upon that.
A. Lead linoleate, or, strictly speaking, lead isolinoleate, changes form, is decomposed when it is subjected to water and goes
632 back into the basic lead or the lead hydroxide and free linoloic acid. That is very easily demonstrated in the laboratory.
Q. Do you speak from theory or from actual experience with practical tests?
A. I speak from both.
Q. Prof. Ladd in his testimony stated that, according to the best information he had been able to gather, the production of carbonate of lead in 1905 had been 200,000 tons. State whether there is any official figure as to the production of carbonate of lead in 1905.
A. There is no official record.
Q. Is there an official record as to the production of carbonate of lead in 1904?
A. Yes sir.
Q. What is that?
A. 123,346 short tons.
Q. Where did you obtain that figure?

A. From official reports of the United States Government.

Q. Do you refer to the report given out by the Department of the Interior, United States Geological Survey?

A. Yes sir.

Q. Prof. Ladd stated that it is not easy to distinguish chemically between sublimed white lead and *les* sulphate. Do you subscribe to that statement?

A. No sir.

Q. What will you say?

A. I will say that sublimed white lead has specific characteristics which are well known to paint chemists, and it is relatively easy to distinguish between sublimed white lead and any other sublimation of lead. Sulphate of lead referred to is a sublimation of lead.

Q. Is it easy to distinguish between sublimed white lead on the one hand and any of the other known compounds containing
633 sulphate of lead?

A. Very easy.

Q. What is the method for determining whether a compound containing sulphate of lead is sublimed white lead or another compound containing sulphate of lead?

A. Sublimed white lead has the specific characteristic of carrying a percentage verying or in the neighborhood of 20 per cent. of a certain form of lead oxide which is absent in that same ratio in any of the other compounds.

Q. Then I understand you to say that whenever you find lead oxide in the ratio of about 20 to, say, 70 or 75 per cent. of lead sulphate, you will determine that it is sublimed white lead?

A. Yes sir.

Q. If you should find no lead oxide, or only a small quantity of lead oxide in combination with sulphate, you will determine that it is not sublimed white lead?

A. Very easily.

Q. Is that a fact well known to paint chemists?

A. I believe it is known to the majority of paint chemists.

Q. Prof. Ladd stated that it was an objection to the use of sublimed white lead that it has a tendency to harden in the can. Have you ever found any such tendency and, if so, compare it with the tendency of carbonate of lead to harden in the can.

A. I have found that sublimed white lead has absolutely a negative quality as regards hardening in the can. It remains much softer and remains softer for a much longer time than carbonate of lead. The tendency of carbonate of lead is decidedly to harden in the package.

Q. Have you, in your examinations of mixed paints con-
634 taining sublimed white lead, found a sample that contained practically no other pigment than sublimed white lead?

A. Yes sir.

Q. Whose paint was that?

A. It was called Neptune White, of the Acme White Lead & Color Works of Detroit.

Q. Could you determine anything in regard to the age of the can, or, rather, of the mixed paint contained in the can?

A. I couldn't exactly determine the age of the can except that the label was dim and the can looked as if it were fairly old.

Q. On opening the can what did you find?

A. When the can was opened, we inserted the spatula and allowed it to sink slowly to the bottom and we found that it was perfectly soft to the bottom of the can and it stirred up very readily and of all the samples that I received, it impressed me most favorably.

Q. Had the can been standing in your own laboratory long enough for the pigment to have hardened or settled?

A. Not to have hardened, but it could have settled because it was standing a week or more.

Q. Before you opened it?

A. Before we opened it.

Q. Had it settled?

A. Not to any appreciable extent.

Q. Have you ever come across mixed paint wherein practically the sole pigment was carbonate of lead?

A. Yes sir.

Q. What did you find there?

A. I made a sample of pure Atlantic White Lead, thinned with the correct proportion of linseed oil and pale turpentine Japan, and we found that within twenty-four hours it had settled relatively hard on the bottom of the can.

635 Q. Could a mixed paint be put out wherein the pigment practically was carbonate of lead and nothing else?

A. No sir.

Q. Is such a mixed paint manufactured by anybody to your knowledge?

A. No sir.

Q. Do you mean that you know that there is no such mixed paint put on the market.

A. Of all the samples I ever examined, I never found one that was composed entirely of carbonate of lead.

Q. Does the National Lead Company put out any such mixed paint?

A. No sir.

Q. Do you know the reason why it does not?

A. It would not be salable if it remained on a man's shelf as long as the other paint remains.

Q. What would happen?

A. It would settle hard, and it would be difficult to break up. I might incidently add that, if it were possible to make a mixed paint of pure carbonate of lead, the National Lead Company would have done so many years ago.

Mr. WATSON: I move to strike out that answer as not responsive and as irrelevant and immaterial.

Q. When you speak of pure carbonate of lead, you mean carbonate of lead and no other pigment?

A. I mean no other pigment with it.

Q. Prof. Ladd spoke of the market price of sublimed white lead and compared it with the market price of carbonate of lead basing his testimony upon figures purporting to be contained in certain trade journals. Have you actually purchased sublimed white lead in commercial quantities?

A. Yes sir.

636 Q. For how long have you been doing that?

A. The last I purchased was the latter part of January.

Q. What year?

A. This year.

Q. What was the market price of sublimed white lead then?

A. 5¾ cents per pound.

Q. At the same time did you purchase carbonate of lead?

A. Yes sir.

Q. What quality?

A. The purest that there is in the market.

Q. What was the market price?

A. 6 cents for one brand, and one which we have on an old contract at 5¼ cents.

Q. When was that contract made?

A. In 1905.

Q. At what place were these the market prices of sublimed white lead and carbonate of lead respectively?

A. New York City.

Q. How did the market price of sublimed white lead and of carbonate of lead compare generally during the year 1905?

A. Carbonate of lead, dry, was about the same price as sublimed white lead.

Q. In the New York market?

A. In the New York market.

Q. I believe you stated in your former testimony that you have been for some years an extensive user of zinc lead white; is that correct?

A. Yes sir.

Q. Prof. Ladd states in his testimony that zinc lead white is very variable in composition; is that your experience?

A. No sir.

Q. What is your experience?

A. My experience has been that it will run as uniform as any commercial chemical product.

Q. What are the variations, that you found, if any?

637 A. They are within two per cent.

Q. What have you found as to the presence of sulphate of zinc in zinc lead white in the samples that have come under your observation and analysis during the last seven years?

A. The percentage of soluble salts, which in almost all cases are zinc sulphate, always run under three quarters of one per cent.

Q. Does the amount of zinc sulphate contained in zinc lead white, according to your experience for seven years, compare with the amount of zinc sulphate contained in New Jersey zinc oxide?

A. It is about the same.

Q. How about the uniformity or lack of uniformity in the color of zinc lead white?

A. I have always found zinc lead white to be of a uniform color within the last seven years.

Q. Would a slight variation in color be any valid objection to the use of zinc lead white as a pigment in mixed paints?

A. Not the slightest.

Q. Would even a large variation be an objection in any but the light shades?

A. Not the slightest.

Q. I will ask you, Mr. Toch, to read the lower half of page 99 and the upper half of page 100 of Mr. Hooker's treatise on white lead and other subjects from which quotations were introduced in evidence on Prof. Ladd's examination. Have you finished reading it, Mr. Toch?

A. Yes sir.

Q. I call your particular attention to the passage where Mr. Hooker says, "Even a small amount of lead will ccuse serious trouble for that particular grade of work. As a painter's pigment,
638 however, the presence of a little lead is of no consequence."

And I call your attention to Sample No. 5 of the five analyses of commercial zinc oxides on page 100, in which sample No. 5 there appears to be present 13.62 per cent. of lead carbonate, and the remark of Mr. Hooker in the next paragraph that sample No. 5 in practical painting will produce satisfactory results. And I will then ask you to state what your interpretation is of the words, "As a painter's pigment, however, the presence of a little lead is of no consequence."

A. I should say that Mr. Hooker's interpretation is perfectly correct. The only instance where this leaded zinc would be harmful would be in the manufacture of white rubber. As a painter's pigment it would, in my judgment, be superior to a zinc oxide containing no lead whatever.

Q. Do you gather *gtom* the entire context of these paragraphs in Mr. Hooker's book that he means to imply that the presence of lead sulphate in western zinc is of injurious consequence in mixed paints?

Mr. WATSON: Objected to as incompetent, the portion- of the *yext* in question being in evidence and speaking for themselves.

A. Mr. Hooker does not mean to imply that the lead in the western zinc is deleterious.

Q. He is speaking in this connection of zinc oxide, is he not?

A. Yes sir.

Q. And he says that the presence of a little lead in zinc oxide would be of no consequence as affecting the quality of the zinc as zinc oxide?

A. That is correct.

Q. For painting purposes?

A. For painting purposes.

639 Q. But it would affect it most injuriously for purposes of white rubber manufacture?

A. For purposes other than paint.

Q. Why would the presence of lead be injurious in white rubber?

A. You couldn't make white rubber of a zinc containing lead, because, in the vulcanizing process, lead would become blackened and in that way you would have a brown rubber or a black rubber, instead of a white rubber.

Q. Prof. Ladd, in his testimony, made the statement that he agrees with the statement of Mr. Hooker that the presence of sulphur dioxide in cases is detrimental to many paint compositions. Let me ask you whether there is a well known method of overcoming the harmful effect of the presence of sulphur dioxide?

A. Yes sir.

Q. What is it?

A. The addition of calcium carbonate.

Q. I believe you stated that you are not well acquainted with western zincs?

A. No sir.

Q. Suppose a sample of western zinc should contain 0.43 per cent. of sulphur dioxide, how much calcium carbonate would you regard as proper and necessary to overcome the injurious effect of the sulphur dioxide?

A. That is very easily stated. Theor-ically it would be less than one per cent., but as I stated before, wherever we can — put in five per cent. of calcium carbonate on principle, in every paint that we make.

Q. For reasons that you have heretofore stated?

640 A. *A.* For reasons which I have stated, the free acid in paint.

Q. In various ingredients of the paints?

A. In various ingredients, yes sir.

Q. Prof. Ladd, in his testimony, stated that lithophone cannot be used in connection with lead, or cannot be used satisfactorily as a paint where lead paints have been previously employed on the surface. What is your opinion about that?

A. I am free to differ with Prof. Ladd on that subject.

Q. Do you differ on theory, only?

A. No sir.

Q. Or do you differ also as a matter of practical experience?

A. Absolutely on a matter of practice.

Q. Why do you differ as a matter of theory?

A. A properly made lithophone should not contain any soluble sulphide salts and, if it doesn't contain any soluble sulphide salts, it cannot react on lead.

Q. In your experience with lithophone you have found it to be practically inert, have you not?

A. It is absolutely inert as a pigment.

Q. Inert also upon lead?

A. Yes sir.

Q. And you have used lithophone very extensively, have you not?

A. Very extensively for nineteen years.

Q. And have used — also in connection with lead, or where it came in contact with lead?

A. Where it came in contact with lead.

Q. Prof. Ladd says that lithophone becomes streaky in appearance from reaction with lead if lead were present in a previous coat of paint. What will you say about that statement?

A. If it ever does become streaky, it is not due to the lead:
641 it is due to the conditions in the oil.

Q. Would the lithophone be to blame, then, for the streaky appearance?

A. No sir.

Q. What would be to blame?

A. The ignorance of the manufacturer in using an oil which is too acid.

Q. Prof. Ladd further states that barytes used in mixed paint is gritty, has a tendency to run, to cut in the paint as it runs when it is put on the side of a building, and he further states about barytes, that it is heavy like sand and runs down and don't combine with the oil and produces a streaky or running or gritty appearance. Does this statement accord with your experience, Mr. Toch?

A. No sir.

Q. Does any part of this statement find endorsement in your experience?

A. Not a single word.

Q. Have you made numerous tests as to the working qualities of mixed paint containing barytes as one of its pigments?

A. Yes, sir.

Q. So that what you say is not based upon theory or book knowledge, but upon your actual knowledge and the evidence of your senses?

A. Based upon my actual knowledge of the application of such paints.

Q. In isolated instances or in numerous instances?

A. Very numerous instances.

Q. I show you a book here and will ask you to state what it is?

A. "Mineral Resources of the United States, Calendar year 1904, Department of the Interior, United States Geological Survey, Charles D. Walcott, Director.

642 Q. For what year?

A. 1904.

Q. And printed by whom?

A. Printed in Washington by the Government Printing Office, 1905.

Q. I will ask you to turn to page 1095 of that book and read what is there said about the value of barytes.

A. "The value of barytes as a white pigment is being recognized more and more each year: and although there may be very little if any, that is used alone for this purpose, it is used in large quantities to mix with white lead, zinc white, or a combination of both of these white pigments. This addition is not as an adulterant, as was the case a few years ago, for it is now appreciated that the addition

of barytes makes a white pigment more permanent, less likely to be attacked by acids, and freer from discoloration that when white lead is used alone. It is also believed that the barytes gives greater body to the paint and makes it more resistant to the influence of the weather. As is well known, pure white lead, when it remains in the shade or in a dark place, becomes discolored, turning yellowish, while mixtures of white lead and zinc white, or of white lead and barytes, or of white lead, zinc white and barytes, retain their color permanently even in dark places."

Q. Do you agree with that statement?

A. Yes, sir.

Q. Does this statement agree with your own experience in practical tests and experiments?

A. Yes, sir.

Q. I will ask you to look at page 1103 of the same official publication and first state what material is referred to in the sentence beginning with "The introduction of this material into paint."

643 A. This refers to the material barytes.

Q. Now, please read the passage beginning with the words heretofore quoted:

A. "With the introduction of this material into paint, the question at once arose as to whether or not its presence was objectionable. or otherwise than in increasing the weight or the volume of the paint, according as to the way in which it is sold. In a great many of the paints now on the market, more or less of this article is used. The barytes, which makes a white pigment, will mix by itself readily with linseed oil and make a paint that covers a surface smoothly and evenly and that wears probably even better than a white lead. Combined with white lead, although it increased the weight, it makes in the end, a better pigment in many respects than white lead alone, and if the white lead is sold by volume instead of weight, there can be no objection whatever to the barytes being mixed with it."

Q. Does this statement accord with your opinion and experiences?

A. Yes, sir.

Q. How is mixed paint sold in cans to the consumer, by volume or by weight?

A. Always by volume.

Q. Have you used a combination of lead, zinc and barytes?

A. Yes, sir.

Q. With what effect?

A. When I was a student I had many arguments with my father, who was a very practical man, on the subject of the newer pigments, particularly zinc oxide and barytes, and in 1882 I asked him to permit me to make an experiment to consist of one third lead, one third zinc and one third barytes, which I thought would out-

644 wear either lead or zinc. He permitted me to do so, and the building which is known as No. 35 Bowery, in New York which my brother and I still own, was painted for a distance of 180 feet of the gable wall about 100 feet above the ground—it is a high building—and my brother and I have purposely allowed this sign to remain, which is now 24 years, exposed to the salt air of the New

York City climate, and it is still to-day in fairly good condition. That was my first large practical experiment in this combination.

Q. Did you find barytes to run or sag or cut in the paint or appear streaky or gritty or slimy?

A. Quite the opposite. We applied three coats, and I had the satisfaction of knowing that before my father died he quite agreed with my newer policies as to paint making.

Q. Prof. Ladd stated that one of the objections to calcium carbonate is that it is alkaline in its nature and therefore tends to destroy the oil and rot it. Is whiting alkaline?

A. No, sir.

Q. Has it any such tendency as Prof. Ladd stated?

A. No, sir.

Q. Do you speak merely as a chemist or also from practical experience?

A. I speak from the standpoint of a chemist and from practical experience.

Q. I believe you stated on your previous examination that you were not acquainted with white mineral primer?

A. I am not. I am acqainted with it as a chemist but not as a practical paint man.

Q. As a chemist, is it your opinion that white mineral primer is alkaline?

A. It couldn't be.

Q. Have you frequently examined linseed oil, both raw
645 and bleached with a view to determining the presence therein of free acids?

A. Yes, sir.

Q. What have you found?

—. We have found that, in a well settled old linseed oil, if the free organic acids are in their normal condition, they are not very extensive. In bleached linseed oil, which is bleached according to the modern process, by the addition of sulphuric acid, it doesn't always happen that the sulphuric acid is entirely washed out, or allowed to settle out, so that frequently we will find our bleached linseed oil will be more acid than an old, raw linseed oil.

Q. Now, the presence of free acids, either in the raw or the bleached linseed oil, would have what effect upon carbonate of lead?

A. Would liberate the carbonic acid and form a linoleate or isolinoleate of lead?

Q. What would become of the remaining ingredients of what formerly was carbonate of lead?

A. The carbonic acid would be liberated, would be set free.

Q. And the balance?

A. And the balance would be combined.

Q. What would be the effect of that upon the paint?

A. That would tend to shorten the life of the paint.

Q. In what manner would it make its appearance?

A. The linoleate of lead formed in this combination is very readily dissociated by water, particularly water which contains carbonic acid.

Q. Do you regard this presence as the cause of the flouring or chalking or carbonate of lead?

A. Partly the cause.

Q. There are other causes for that same tendency?

A. There are other causes for that same phenomena.

646 Q. Prof. Ladd, under cross examination, stated that lithophone, so far as it is a salt, is a complete chemical composition but, so far as it is an oxide, the oxide is in shape to combine with other constituents for which it has an affinity. What will you say about that?

A. I am very much afraid Prof. Ladd never was inside of a lithophone factory nor ever made any. Lithophone is a pigment which possesses more remarkable qualities. It cannot vary in its chemical composition for the reason that a solution of barium sulphide is reacted with a solution of zinc sulphate and the molecular precipitate will closely approach 29½ per cent. of zinc sulphide and 70½ per cent. of barium sulphate, making a total of 100.

Q. Now then, do you say that lithophone altogether is a complete chemical body?

A. Yes sir.

Q. Is it an oxide in any such sense as Prof. Ladd speaks of?

A. It frequently contains a small percentage of oxide, which is largely negligible and due to its process of manufacture.

Q. And has this oxide a tendency to combine with other constituents for which it has an affinity?

A. It is so very small that the combination is negligible.

Q. Under cross examination Prof. Ladd made the statement that silica, being crystalline, has some tendency to run in mixed paint, though not the same tendency in that regard as barytes. What have you to day about that statement?

A. That has absolutely no tendency to run in mixed paint.

Q. Has the chrystallinity of a pigment anything to do with the tendency to run or sag in the paint?

A. No sir.

647 Q. What does that tendency come from where it exists?

A. From the improper ratio between the soluble pigment and the vehicle.

Q. Has the fineness of the particle to do with the increasing or decreasing of that tendency?

A. The fineness of a pigment always tends to lessen the otherwise mechanical defects.

Q. Among others, the mechanical defect of a tendency to run or sag?

A. Yes sir.

Q. The finer the particle, the less is that tendency to run or sag? is that right?

A. Yes sir, that is a rule in physics.

Q. I call your attention to page 585 of Prof. Ladd's celebrated bulletin No. 67, and will ask you to look at the analysis there given of two samples of lithophone, with a view to asking you whether you have found lithophone of that composition in late years?

A. Not in late years.

Q. The samples that are analyzed do contain oxide?

A. Yes sir.

Q. As to those samples, if any such were used, would you say that there was a tendency of the oxide to combine with other constituents for which it has an affinity?

A. Yes sir, in ratio to the percentage of oxide.

Q. How long have you examined samples of various kinds and makes of lithophone?

A. For nineteen years.

Q. And you say that in all the samples that you ever examined the amount of oxide was a negligible quantity?

A. I considered it a negligible quantity.

Q. How do you account for anybody having found sam-
648 ples of lithophone analyzing as shown here on page 585 of the bulletin?

A. According to the old method of manufacture—I believe these analyses were made by Mr. Hurst—the old method for the final operation consisted in heating the zinc sulphide and barium sul-phate a second time in a kiln up to 1100 degrees. This produced the zinc oxide. The later method of making it is not to heat the second time beyond 940 degrees, which reduces the percentage of oxide very frequently below one per cent.

Q. When you speak of late years, how many years back of the present time do you have in mind?

A. The greatest improvement in lithophone has taken place within the last six or seven years.

Q. Then no such sample of lithophone could have been manufactured within the last six or seven years, according to your experience?

A. No sir.

Q. Returning to silica, what is your experience as to the amount of oil which this pigment takes as compared with the amoun- of oil which carbonate of lead takes?

A. Carbonate of lead will take ten per cent. of oil normally to produce a thick paste.

Q. I am speaking of mixed paints now.

A. Oh, in mixed paints?

Q. Yes.

A. The ratio is very nearly the same in all of these, the ratio of solids to liquids is usually as 60 is to 40, 60 representing the solid in mixed paint and 40 the vehicle.

Q. What I mean is, Mr. Toch: Isn't silica capable of taking several times more linseed oil than carbonate of lead?

A. Yes sir, it will take from three to six times more linseed oil than white lead, according to the quality of silica.

Q. Is that a virtue?

A. Yes sir.

649 Q. In what regard?

A. In so far that the amount of oil is normally increased in a good paint.

Q. Of course nobody would think of using silica as a single pigment in mixed paint?

A. No sir.

Q. Please state whether chemical combination between the pigment and the linseed oil is required in order to prevent the pigment from settling or sagging or running?

A. No sir.

Q. Has chemical combination anything to do with that question at all?

A. Absolutely not.

Q. In his cross examination Prof. Ladd stated that he should not expect a combination between barytes and linseed oil to be as elastic as a combination between carbonate of lead and linseed oil, and that he should expect a combination between barytes and linseed oil to crack more readily than a combination between carbonate of lead and linseed oil. What is your experience upon this question?

A. Why, I know that it is just exactly the opposite, that a film produced by means of barytes and linseed oil is much more elastic and weather resisting than a film of paint produced by mixing white lead and linseed oil.

Q. Can you give an idea about how many tests and experiments you base this opinion upon?

A. That would be very difficult to say; I suppose my entire paint tests would be equal to at least 1,000 a year; at least.

Q. Then the practical tests and experiments upon which you have based this statement that a combination of barytes and linseed oil is more elastic and has less tendency to break or crack than a combination of carbonate of lead and linseed oil, would count not by tens but by hundreds, would they?

650

A. Yes sir.

Q. Would they count by thousands?

A. Particularly on barytes, do you mean?

Q. Yes, combination of barytes and linseed oil.

A. Simply barytes and linseed oil? No sir. It wouldn't be necessary to make a thousand tests to demonstrate that.

Q. Have you made as many as a thousand tests with a combination of linseed oil and other pigments where barytes formed a considerable portion of the pigment?

A. Yes sir, I have made more than that.

Q. Have you examined sublimed white lead under the microscope?

A. Yes sir.

Q. Is it crystalline or is it amorphous?

A. It is absolutely amorphous.

Q. Have you examined carbonate of lead under the microscope?

A. Yes sir.

Q. Look at these photomicrographs which I hand you and state whether they are respectively fair samples of the appearance of carbonate of lead and of sublimed white lead under the microscope?

A. They are very fair samples of both.

Q. Which shows the finer particles?
A. The sublimed white lead.
Q. Hand me the one which represents the appearance under the microscope of sublimed white lead.
A. Yes sir, this is it.

Mr. ZEISLER: I offer this in evidence and ask that it be marked Complainants' Exhibit B. (See Page 539.)

Q. Hand me the one which represents the appearance of
651 carbonate of lead under the microscope.
A. I hand it to you, sir.

Mr. ZEISLER: I offer this photomicrograph of carbonate of lead in evidence and ask that it be marked Complainants' Exhibit C.

Q. Prof. Ladd, in his testimony, quoted from Prof. Hurst's work, page 43, where the author says about white lead that "it is distinguished from all other pigments by the ease with which it admixes with oil and by forming a paint which readily flows from the brush, whereas most pigments, as *m* for instance, barytes tend to work what the painter calls slimy or livery and streaky." In the tests numbering upwards of 1,000, according to your statement, made with mixed paints wherein barytes formed a substantial portion of the pigment, state whether or not you have ever found that barytes tends to work what the painter calls slimy or livery and streaky?
A. I have not.
Q. Do you know anything about Prof. Hurst's practical experience with paints?
A. I do not.
Q. Is Hurst regarded as a reliable authority on the working qualities of paint?
A. No sir, not by men who know.
Q. In what regard does Hurst enjoy the respect of the paint manufacturers and paint chemists as an authority?
A. As giving methods for analytical reactions in paints.
Q. In that regard he is considered a high authority?
A. He is considered very good.
Q. Mr. Joystad, in his testimony, stated that sublimed white lead does not work nearly as well as carbonate of lead or oxide of zinc, that it has a tendency to drag and set and to tough working; what is your experience in that regard?
A. May I ask whether Mr. Joystad is a painter?
652 Q. Mr. Joystad is the superintendent of Blood's paint factory.
A. I should say Mr. Joystad was entirely wrong on his description of the working of sublimed lead.
Q. You have never found any such tendency?
A. No sir.
Q. Mr. Joystad, speaking of zinc lead white, says that it does not fill the bill because it is crystalline, after its grinding, in a few years it comes back to crystal again. What have you got to say about that?

A. I should say that was a new one on me. I never heard anything like that.

Q. Have you ever found any such trouble?

A. No sir. It isn't crystalline and it is just as amorphous as sublimed white lead, and it works just as easily.

Q. Speaking of lithophone, Mr. Joystad testified that it cannot be tinted with any shade you want to. I presume he meant to say it cannot be tinted with some shades you want to produce. He says "You cannot put any lead or copper pigments in it." What have you got to say about that?

A. I should say Mr. Joystad didn't know anything at all about it. You can tint it with anything you choose.

Q. Is there any affinity between lithophone or any of its ingredients and lead or copper where copper might possibly be found in some trace in some coloring matter that would make it objectionable?

A. No sir; there are thousands of pounds used every day tinted.

Q. Tinted with other pigments that contained lead?

A. All kinds of pigments.

653 Q. Including coloring matter in which there might be traces of copper?

A. No sir, copper isn't used as a tinting color.

Q. Well, is there copper present in some tinting color?

A. No sir, not to my knowledge.

Q. Mr. Joystad was, when he testified, under the impression, as he stated, that Paris Green was used as coloring matter Have you ever heard of any such thing being done by any paint manufacturer who knows his business?

A. I shouldn't be surprised that Mr. Joystad, from his testimony, would use anything. Paris green would be simply ridiculous to use as a tinting color. It hasn't any.

Q. Mr. Joystad testified about an experiment which he made wherein he used sublimed white lead as an ingredient in a mixed paint. He stated that he used sublimed lead, carbonate of lead and oxide of zinc in the experimental sample which he made. He weighed them separately and ground them all together by mixing. He stated that he mixed the zinc first, then he put in the sublimed white lead and then the carbonate of lead, thinned it down after it was ground and then tried it. Altogether, the sample of mixed paint which he thus made was not over a gallon. The grinding was done in a water cooled mill. The temperature produced by the grinding process was not more than likewarm. The fault which Mr. Joystad found with the mixed paint thus produced was that it didn't work freely. Give us your judgment about the fairness of this experiment.

A. If Mr. Joystad didn't state how much vehicle or thinner he used to the number of pounds of pigment, his testimony
654 would be no good, because he might have had a paint which was too thick to work and in that way had difficulty in spreading.

Q. How about one gallon as a test for grinding?

A. I should think it would be lost in the eye of the mill, that is the center of the mill.

Q. Can you get a fair grinding when all the pigments ground is only sufficient to make up one gallon of mixed paint after the linseed oil is added?

A. I have a mill especially built for that purpose in which I can make one gallon of paint.

Q. But *rh* ordinary mill?

A. The ordinary mill you can't make a gallon of paint.

Q. Does the working quality of a paint depend solely upon the ingredients?

A. It depends upon all the ingredients.

Q. Does it depend only upon the quality of all the ingredients or are there other things that have to be observed in the manufacture?

A. Oh, yes, you must know how to manipulate the various materials, in what ratio to mix them, how to grind them, how to thin them, all of which are factors in the success of the experiment.

Q. Has the temperature, the degree of heat produced in the grinding something to do with the result?

A. Very frequently.

Q. You might, might you not, Mr. Toch, take none but the very best ingredients and still produce a paint which would not work well?

A. Undoubtedly.

Q. The trouble is, then, would not be with the ingredients but with the methods of manufacture, would they?

A. It would be the fallability of human nature in that regard, the fallability of the man who made the material not having sufficient knowledge.

Q. Of how to manufacture?

A. Of how to manufacture.

655 Q. Proper methods of grinding are quite as essential, are they not, as the use of proper ingredients?

A. They are absolutely necessary.

Q. Since you testified before in this case, have you made analyses of mixed paints containing sublimed white lead?

A. Yes sir.

Q. Will you state how many samples you have thus analysed who were the manufacturers of the mixed paints and what were the percentages of sublimed white lead which you found? Have you got a list of those mixed paints which I just referred to in the question?

A. Yes sir.

Q. Is this it?

A. That is it, sir.

Mr. ZEISLER: Instead of having the witness go through all these names, I will introduce this schedule in evidence and ask that the same be marked Complainants' Exhibit D and request that it be incorporated in the record. (See page 541).

Q. All the samples which you analyzed were contained in sealed cans, were they not?

A. Yes sir. I notice that some are omitted, the results of some are omitted.

Q. What is the reason why?

A. They were not finished the day I left.

Q. Do you know that they did contain sublimed white lead?

A. Yes sir.

Q. The exact quantity, however, you had not yet determined by the time you left New York?

A. That is correct. With one exception, I notice here, No. 50, we weren't certain that No. 50 contained sublimed white lead.

656 We hadn't made the complete quantitative determination. All the others contained sublimed white lead.

Q. Now, you numbered these samples for the purpose of making your analysis and then made up this statement; is that correct?

A. Yes sir, I did.

Q. Now, the numerals in the column headed "Number" give the numbers which you gave these various samples: is that correct?

A. Yes sir.

Q. Under the column headed "Name" you give the name of the manufacturer and the place of the factory?

A. Yes sir.

Q. As you found them on the labels of the various cans?

A. Yes sir.

Q. Under the head "Shade," you show the color?

A. Yes sir.

Q. Of the mixed paint. And under the head of "Sublimed lead" you show the percentage of sublimed lead which you found in the pigment in these mixed paints?

A. Yes sir.

Q. Look at Sample No. 10, Alston Manufacturing Company, Chicago.

A. Yes sir.

Q. The shade isn't given but instead of that the statement shows No. 965.

A. Yes sir.

Q. What does that mean?

A. As near as I know, that refers to outside white.

Q. Where did you get that number?

A. That was on the can.

Q. What color did the paint have?

A. I don't remember the color; I am under the impression, however, that it was white.

Q. Now, look at Sample No. 12, as shown in that list. In the column headed "Shade" this sample is designated as No. 28. Now, what does that No. 28 under the head of shade mean?

657 A. I know that all those that were numbered were light shades, many of them white, but in the pressure of doing this work there was no time at the last moment to tabulate the colors which we did examine.

Q. Then in the case where, instead of giving the shade, you gave the number, you have given a number that you found on the label

of the can but cannot state with exactness just what color the paint was except that, in a general way, they were all light?

A. Yes sir.

Q. Do these fifty-six manufacturers whose products have been analyzed according to this Exhibit D belong among the leading mixed paint manufacturers of the United States?

A. Yes sir.

Q. Did you make any working tests with any of the mixed paints the analyses of which are shown in this exhibit D?

A. Yes sir.

Q. State in a general way how the tests were made?

A. Mr. Lane and I made the tests together.

Q. Where?

A. At my laboratory in Long Island City. We started on the 10th of February in the morning. We procured boards, the best that we could get, four by twelve, and a quarter of an inch thick; they were well seasoned.

Q. What wood?

A. I believe that is white pine; I don't know the exact—Is white pine correct?

Q. I think it is.

A. White pine; which would represent the same wood that is used in building construction. The boards were numbered according to the numbers of the analyses and the first coat was applied, starting at 10:30 on the morning of February 10th, and we worked until six o'clock in the evening, applying first coats to some-
658 thing like twenty-five or thirty samples. Included in that test was a test of pure Atlantic White Lead, properly mixed, a test of pure Atlantic White lead containing 25 per cent of barytes, and a test of pure Atlantic White Lead containing 33⅓ per cent. of barytes. Mr. Lane, on opening the can, invariably called my attention to the condition of the paint and when he inserted his spatula it would sink slowly down to the bottom in every case of the paints under examination excepting those we made ourselves. They stirred up very easily and, without a single exception, the paints *were* examined were excellent mixed paints. The next day we started again at about 10:30—and we were as absolutely fair in this test as we could possibly be. The boards were all put in a cupboard, standing upright, not lying down so that the paint would not run, but standing upright in the cupboard, the cupboard, of course, remaining open so that light and air would circulate in the cupboard.

Q. When you say "standing upright" you mean standing in a ver*itcle* position?

A. Standing in a vertical position. And the next morning at 10:30 the majority of them was dry. We applied the second coat, taking the most scrupulous care of the brushes, and the third morning we applied the third coat whe-ver we could possibly apply it.

Q. Now, in applying the second coat, did you leave a part of the first coat uncovered by the second coat?

A. We left a margin in each board, representing respectively the first, second and third coats.

Q. You said that all the samples of mixed paints were
659 excellent paints; do you mean all the samples with which you made tests or all the samples that you had analyzed and had found contained sublimed white lead?

A. I believe I mentioned that; all the samples except those we made ourselves, which were composed of white lead and various mixtures.

Q. Did you also make a working test with paint manufactured by T. N. Blood & Co.?

A. Yes sir.

Q. And did you also make a working test with mixed paint manufactured by the Minnesota Linseed Oil & Paint Company?

A. Yes sir.

Q. Did you mean to include *them* in your statement that all the paints that you used were excellent paints?

A. No sir, I only meant to include those which w-re numbered according to our analytical scheme. The Blood and Minnesota paints are lettered in contradistinction.

Q. You mean lettered on the back of the boards showing the test made with them?

A. Yes sir; we also lettered the Blood and Minnesota paints for analytical purposes.

Q. State whether the conditions reguarding the boards, the temperature of the room, the condition of the brush, and all other outward conditions were exactly the same with reference to all the working tests that you made?

A. The conditions were absolutely uniform and absolutely ideal for making paint tests.

Q. Have you those boards showing these tests with you?

A. Yes sir.

Q. Have you placed on the back of the boards a label?

A. Yes sir.

Q. Do those labels bear numbers corresponding to the
660 numbers in Exhibit D?

A. Yes, sir.

Q. Do they show the analysis so far as you have made it?

A. Yes sir.

Q. Do they show your conclusion as to the condition of the mixed paint in the can and also as to working quality of the paint?

A. They show the practical conclusion arrived at by Mr. Lane and myself.

Q. And the label also shows the dates when the first, second and third coats respectively were put on the board?

A. Yes sir.

Q. And then each of these labels is signed in your handwriting and in the handwriting of Mr. Lane, is it?

A. Yes sir.

Q. When you speak of Mr. Lane, do you refer to Mr. Frank A. Lane, who testified in this case before?

A. I do, sir.

Q. Had all of those samples been in your possession long enough so that they might have settled in the can?

A. Yes sir.

Q. Please look at the fifteen boards which I now hand you and state whether they are the boards upon which you made the tests with mixed paints containing sublimed white lead and shown on Exhibit D?

A. Yes sir.

Q. How many are there all together?

A. Fifteen.

Mr. ZEISLER: I offer these fifteen boards just identified by the witness in evidence and ask that they be marked respectively Complainants' Exhibits 1 to 15, both inclusive.

Q. Did you choose the samples containing sublimed white lead with which you made these tests with deliberation or at random?

A. We chose the samples as we put our hands on them provided they were white. We had a large number which were not
661 white and these were excluded.

Q. Then you chose them at random?

A. Yes sir.

Q. Now, look at the boards which on the back are marked A, B and C respectively, and state whether the labels pasted on the back thereof respectively show the correct analyses as made by you of the paints with which the brushing test was made on those boards respectively?

A. Yes sir, I weighed these out and Mr. Lane mixed them.

Q. The method of making the working test in these samples marked A, B and C respectively was the same, was it, as in the working tests in the other cases?

A. Exactly the same.

Mr. ZEISLER: I offer these three boards in evidence and ask that they be marked respectively Complainants' Exhibits 16 to 18 inclusive.

Q. Look at the board which I now hand you and which is on the back marked D, and state what paint was used in making this test.

A. In sample D, the Minnesota Linseed Oil Paint Company's outside white was used.

Q. Have you got the analysis of the paint which you there used?

A. Yes sir.

Q. I don't find it on the label; will you please give us the analysis?

A. That was composed of fifty per cent. of carbonate of lead and fifty per cent. of oxide of zinc.

Q. So far as the pigment is concerned?

A. Yes sir.

Q. Was the working test upon this board marked D made under the same conditions as governed the making of the tests in the other cases?

A. Yes sir, excepting that the second coat could not be ap-
662 plied on February 11th, 24 hours after the first coat, because it dried too badly. It had to be put on forty-eight hours later.

Mr. ZEISLER: I offer in evidence the board just identified by the witness and ask that it be marked Complainants' Exhibit 19.

Q. Please look at the board marked on the back E and state what paint was used in making the test appearing upon that board.
A. N. W. Outside White, T. L. Blood & Company, St. Paul.
Q. Did you analy-e the paint used upon that test?
A. Yes sir.
Q. What did you find the composition of the pigment to be?
A. Thirty per cent. of carbonate of lead and approximately 70 per cent. of zinc made from western ore.
Q. Was the test on board E made under the same conditions as the other tests?
A. Yes sir, but that too dried slowly between the first and second coat.
Q. You had to wait forty eight hours before applying the second coat?
A. "Badly settled in can; worked spongy."
Q. What did you find about the settling of the paint of the Minnesota Linseed Oil Paint Company, the test of which appears on the board marked D?
A. "Paint very dirty, showing considerable foreign substance; paint had settled badly in the can."

Mr. ZEISLER: I offer the board last identified by the witness and marked E on the back and ask that the same be marked Complainants' Exhibit 20.

Q. Look at the can which I now hand you, Mr. Toch, and state whose paint this can was supposed to have contained, according to the label?
A. Minnesota Linseed Oil Paint Company, Minneapolis.

663 Mr. STERN: What number or shade was it?
A. No. 67 containing a special notice: "This shade cannot be used over or mixed with white lead. Use No. 3 or Cement X for priming coat."
Q. Now, there is a white label on the other side of the same can; I will ask you to state what this white label shows.
A. The white label states, "Strictly pure paint, consisting only of pure carbonate of lead, pure oxide of zinc, pure tinting colors, carefully mixed and thoroughly ground in our pure linseed oil, oure turpentine, pure Japan driers, put up in full measure and sold subject to chemical analysis. Signed, Minnesota Linseed Oil Paint Company."
Q. Look at the color card of the Minnesota Linseed Oil Paint Company which I show you and identify, if you can from that color card, what shade their paint No. 67 is.
A. No. 67 is permanent vermilion, according to their color card.

Q. Does the inside of the can indicate that same color?
A. Yes sir.
Q. Is it possible for a paint of that shade to contain carbonate of lead or oxide of zinc?
A. No sir.
Q. Did you ever make brushing tests in severe cold weather?
A. Very seldom.
Q. Is it usual to apply paint on surfaces, not for the pirpose of tests but for practical used, in cold weather?
A. Do you mean in extreme cold weather?
Q. Yes.
A. No sir, it is not usual.
Q. How do paints generally work when applied in cold weather?

664 A. There is a very peculiar reaction that takes place, at a temperature, say, of 31 degrees Fahrenheit or less, which I would designate the absolute stopping of catalytic action in linseed oil, and no man ought to paint below 31 degrees Fahrenheir.

Q. Now, does that same difficulty exist no matter what pigment is used in the paint?
A. The pigment has no influence whatever; it is the oil.
Q. Is it or is it not a fact that, wherever there are directions on the label of a can of mixed paint, they contain a caution against using the paint or applying it in cold weather?

Mr. WATSON: I object to that as incompetent, the labels themselves being the best evidence.

A. Generally they do.
Q. Look at the can which you previously identified and state whether, among the directions for use, there is not the caution, "Never paint immediately after a rain, storm, frost or heavy dew."
A. Yes sir.

665 Cross-examination.

By Mr. WATSON:

Q. Prof. Toch, if you are examining a sample of mixed paint, you say that you are always able to tell, to distinguish between the ingredients of sublimed white lead and sulphate of lead?
A. Yes sir.
Q. Suppose that, in the examination of such a mixed paint, you found that there was present, say one or two per cent. of sulphate of lead. Could you tell whether that leaf was simply incidental to the production of zinc from western ores or whether it was found there or caused by the adding of the production known as sublimed lead in it?
A. Yes sir.
Q. Then it makes no difference whether the percentage is as low as one per cent. or as high as 97.6 per cent., shown in your exhibit of analyses here, you always can tell whether it is sulphate of lead or sublimed white lead?

A Every time.

Q. Now, will you tell us exactly what is the chemical test which you apply in order to determine whether this substance is sulphate of lead incidental to the production of the zinc made from western ores, which carry sulphate of lead in their natural composition, or whether it is the manufactured product known as sublimed white lead?

A. One gram of the dry pigment so obtained was weighed into a small beaker and digested with 50 c. c. of acetic acid (1 volume of water to 1 volume glacial acetic acid) on a sand bath for an hour or so, filtered and washed. This treatment removes zinc oxide,
calcium carbonate and oxide of lead from oxy-sulphate of
666 lead, leaving undissolved the $PbSO_4$. The filtrate was tested
for zinc qualitatively, which was always found. The residue and the filter paper were placed in the beaker in which the treatment with acetic acid was made, and to this was added 40 c. c. of water, 20 c. c. of strong ammonia (90 sp. gr.) and a slight excess of hydrochloric acid. This was heated on a sand bath for several hours, filtered hot, and washed with hot water. The ammonium chloride dissolves the lead sulphate, leaving barytes, silicious matter, etc. In this ammonium chloride extract, lead sulphate was determined by two methods; 1st, from SO_4—2nd, from $Pb.SO_4$ was determined gravimetrically as $BaSO_4$. To determine lead, ammonium acetate was added to the ammonium chloride extract, whereby the solution was made acid with acetic acid, the lead precipitated by an excess of standard potassium bichromate solution, heated, allowed to settle, filtered and washed. To the filtrate was added potassium iodide and sulphuric acid, whereby the excess bichromate liberates iodine qualitatively. After ten minutes or so, the solution was made up to 250 to 300 c. c. and titrated with standard sodium thiosulphate solution with the addition of starch indicator. The number of c. c. of standard potassium bichromate used to precipitate lead as lead chromate was thus determined, and from this, by calculation, the amount of lead in the solution. From this data, lead sulphate was calculated and from this oxy-sulphate by dividing with the factor .75 the average per cent. of $PbSO_4$ in sublimed lead. Zinc oxide is determined in acetic acid extract of the pigments by the method of Galetti given on page 382 of Sutton's
Volumetric Analysis. By this method, the acetic acid
667 solution of zinc, which must contain considerable ammonium
acetate, is diluted to about 500 c. c. heated to 50 to 60 degrees Centigrade and titrated with standard potassium ferrocyanide. The end point is found by the change of color from white to ash grey, which occurs when ferrocyanide is in excess. This may be confirmed by uranium accetate used as an outside indicator which shows a faint brown on a white plate when ferrocyanide is in excess. Zinc sulphide is determined in the same manner in the acid ammonium chloride extract after addition of ammonium acetate."

Q. You spoke, Mr. Toch, of a sample of paint made by the Detroit White Lead Company, which you said contained some sublimed white lead as a pigment.

A. I said it contained 100 per cent. of sublimed lead.

Q. In other words, sublimed white lead was the only pigment used in its preparation?

A. The only pigment used in its preparation.

Q. That was called the Acme Paint, did you say?

A. That was called the Neptune Outside White.

Q. Where did you get that sample?

A. It was sent to us by the Acme White Lead Works.

Q. You said you thought it had been in the can for some time because of the condition of the label?

A. Yes sir.

Q. It looked old; is that what you said?

A. Yes sir, the paste had apparently affected the label, which is an indication generally of an old package.

Q. Affected bu exuding through the tin?

A. Yes sir, it rusts the iron underneath the tin and that goes through and spots the label.

668 Q. You know nothing about this change except that you got it in that way?

A. No sir, nothing else.

Q. And you say that, while it was old or apparently so, the mixture hadn't hardened?

A. It hadn't.

Q. Did you analyze that sample?

A. Yes sir.

Q. Or what it contained, I mean?

A. Yes sir.

Q. Did you find any percentage of water in it?

A. There wasn't a trace of water in it. I might also mention that we have a new method of determining water in paints.

Q. No, I don't think I care for it. How large a quantity of sublimed white lead did you purchase in January of the present year at 5¾ cents a pound?

A. Five barrels.

Q. Do you know what the price of it was per carload at the time you paid 5¾ cents per pound for the five barrels?

A. That was the price.

Q. It is just as cheap then by the barrel as it is by the carload, is it?

A. No sir, it costs—our factory cost is very nearly six; the invoice cost is 5¾ and we have to add on the expenses incidental to buying many of these things, such as freight and drayage.

Q. Then when you say that this price of 5¾ cents was what you paid for these five barrels, you have included in it freight, did you say?

A. I have not. That is the invoice cost, but in reality our factory slip shows it to cost close to six.

Q. That is, you add a quarter of a cent on for drayage?

A. And for our freight.

669 Q. Where is the material from, what point?

A. Very likely from Joplin, I imagine.

Q. Do you mean that 5¾ cents is the cost of sublimed white lead in Missouri at the point of production?

A. For four or five barrels, I should think so, yes sir.

Q. What would it be by the carload?

A. There I am reasonably sure we could buy it F. O. B. New York at that rate.

Q. 5¾?

A. 5¾ on such a large quantity.

Q. What did you say was the current price of the best quality of carbonate of lead at New York at the same time?

A. Six cents.

Q. What brand was that?

A. Those were—there were two brands, two or three that we have; one we call Jewett's White Lead, which is an old brand of the National Lead Company, and the other we call Atlantic brand White Lead. Both, however, are made by the same concern.

Q. Are those the highest brands or qualities of carbonate that are put out by the National Lead Company?

A. I think they are.

Mr. ZEISLER: Did you buy those by the barrel?

A. We have a contract and draw from our contract for as much as we need.

Q. Well, how long is your contract good for?

A. That depends upon the time for which we make it; sometimes a year; sometimes fifteen months; sometimes less that that.

Q. How much carbonate of lead do you use in your factory in the course of a year?

A. Very little.

Q. Do you use as much as a carload?

A. Oh, considerably more than that.

670 Q. More than one carload a year?

A. Oh, yes, considerably more.

Q. Well, does the National Lead Company make contracts with consumers whose total consumption does not run much more than a carload or so a year?

A. They will make a contract for an amount much less than a carload. In fact, all of our contracts are based on twelve tons, which is 12/20 of a carload.

Q. Well, would you tell us about how much carbonate of lead you use in your factory a year, measured by carloads?

A. I should say between three and five.

Q. And, measured in the same way, how much sublimed white lead do you use in your factory per annum?

A. We use very little sublimed white lead.

Q. Well, half a carload or five barrels or how much?

A. Well, practically none; I am just beginning again to use it. I use, instead of sublimed white lead, zinc lead; I use that in large quantities.

Q. How long ago did you discard the use of sublimed white lead in your factory.

A. I have practically never discarded it; I have always had it.

Q. Well, you say you have just recently taken up its use.

A. Taken it up in a larger sense.

Q. Well, how largely did you ever use sublimed white lead in your factory, measured by barrels or carloads, per annum?

A. Ohm when we bought it in larger quantities, I believe we used to buy a carload at a time; I am not sure about that.

Q. Tell me per annum how much you ever used of it.

671 A. I couldn't tell you without looking it up.

Q. You never used more than a carload or two of it a year at any time, did you?

A. I believe that is correct.

Q. How many years ago was it that you partially discarded it and substituted zinc lead white?

A. Seven years ago.

Q. How did you happen to discard it seven years ago in favor of zinc lead white?

A. The price of zinc lead white was considerably lower than that of sublimed lead; the ratio of sulphate to oxide was such that I found, by making a manipulation of the addition of other lead compounds, I could attain similar results, results which were satisfactory for a certain class of paints.

Q. Then, notwithstanding the valuable qualities and the virtues of sublimed white lead, you did pretty largely exclude it from use and substituted the zinc lead white because you found it was more profitable than to use the lead?

A. No sir, not at all.

Q. Well, you just said you could get the same results at a less cost.

A. But——

Q. Well, you have just said that, haven't you? That is true?

A. I got a paint which answered the same purpose, I said.

Q. And you got it at less cost, didn't you?

A. Not particularly at a less cost; probably an easier method for me.

Q. Then I was wrong in gathering from your evidence, what you have testified here a few moments ago, that the matter of a difference in cost between the zinc lead white and the sublimed white lead had something to do with your excluding the latter from your

672 factory, was I?

A. Yes sir.

Q. What you said didn't justify that inference upon my part?

A. No sir, it did not.

Q. Why did you go back again, then, to the use of sublimed white lead more lately in your factory?

A. Sublimed white lead is very much whiter than zinc lead.

Q. Is th-t why you came back to its use?

A. No sir, not entirely.

Q. I asked you to state why, after having practically excluded it from use in your factory, in favor of zinc lead white, you hav- more lately returned to and resumed its use in your factory?

A. For one reason, my firm has a very large contract for a special

shade of mixed paint for the Philadelphia Elevated Railway Company, and I probably will find sublimed white lead suitable for that mixture.

Q. That is why*m* then, you have returned to the use of sublimed white lead lately, is it?

A. Yes sir.

Q. For about how many years did you exclude it pretty largely from use in the manufacture of mixed paints in your factory?

A. I practically never excluded it; I always had some.

Q. How long did you exclude it in the sense in which you have used that term in your previous answers?

A. I cannot answer that any differently *d*ecause I practically never excluded it; I always had some of it on hand.

Q. Using it in the sense that you have stated, that you employed zinc lead white rather than the sublimed white lead in your factory, how long did that difference exist?

673 A. Oh, that is seven years ago.

Q. And how recently is it that you have resumed the use of the sublimed white lead, within the past year?

A. Within the past month.

Q. Since you gave your testimony here upon your examination in chief?

A. Not particularly. I had some on hand while I was here on the witness stand.

Q. Well, you have bought some since you were here and testified before, haven't you?

A. Because we were running low in our stock.

Q. You said that the sublimed white lead was better than zinc lead white because it was whiter; did you say so?

A. Better for making white paints, yes sir.

Q. Well, you didn't mention before any objection to zinc lead white on the ground of its lacking a good white color, did you?

A. No sir, but we are not manufacturers of white paints, very largely.

Q. Well, you do not recognize a defect in the zinc lead white in the matter of its producting a permanent white color, do you?

A. I do not.

Q. Well, what is the objection in the matter of color, then, on account of which you have recently resumed more extensively the use of sublimed white lead in your factory?

A. I am making a particular shade of greenish gray and I find that the color or the tone of the zinc lead interferes with making that particular shade.

Q. I understood you to say, in answer to Mr. Zeisler, that zinc lead white had possessed uniformity on the matter of color within the past seven years; is that your testimony?

674 A. Yes sir.

Q. How was it prior to the last seven years? Did it lack uniformity?

A. I didn't know it prior to that time.

Q. Do you mean that zinc lead white was so little known as a com-

mercial product in the manufacture of mixed paints that, as a chemist and practical manufacturer, you had not run across it until several years ago?

A. It was made so far in the west that I don't believe it was ever offered on the eastern coast until seven years ago.

Q. Then whatever is known about its valuable qualities as an ingredient in the preparation of mixed paints by eastern chemists and eastern manufacturers is the result of only seven years? experience with it, is it?

A. No sir, it only refers to me; I can't answer for what the other chemists know or don't know.

Q. But you have just said in a previous answer that you don't think zinc lead white appeared in the east until about seven years ago.

A. That wouldn't prevent another chemist from finding out something about it.

Q. If it had been there as a commercial product and a recognized pigment, of value in the preparation of mixed paints, would you have been ignorant of the fact?

A. Possibly I would.

Q. Well, don't you know, as a matter of fact, that it is true that this pigment did not extensively appear, or generally appear in the eastern part of the United States until about seven years ago?

A. I do not.

Q. Would you regard the presence of .43 per cent. of sulphur dioxide in connection with the zinc sulphate as injurious in
675 the production of mixed paint?

A. In what form would that sulphur dioxide be?

Q. Well, I mean as given in the analysis of Mr. Hooker, referred to in your examination by Mr. Zeisler.

A. Well, Mr. Hooker does not say in what form it is.

Mr. ZEISLER: (Handing witness book.) Here is the entire analysis. I object to the question, however, on account of the mixing up in the question of sulphus dioxide and zinc sulphate.

A. Mr. Hooker may mean sulphur dioxide in combination with some other base; is that what you mean?

Q. Well, take it as given in his No. 4 at the top of page 100.

A. The same analysis is usually found in cement, where they use——

Q. Well, no matter about that. I want to know if you agree with Mr. Hooker as to the injurious effects of that percentage of sulphur dioxide.

A. I- could not exist freem so I would like to know what it must be combined with.

Q. Well, take it upon the analysis of the sample as given at the top of page 100 and referred to by him under No. 4.

A. If it didn't exist as a free SO2, it wouldn't do any harm.

Q. Suppose it did exist in that form, then would it do harm?

A. Then a paint manufacturer would add a small percentage of calcium carbonate.

Q. In other words, its presence in any appreciable percentage

makes it necessary to overcome the injurious effects of it by adding calcium carbonate, does it?

A. No sir, it isn't necessary but it is wise to do it.

Q. Suppose you don't do it, what are the injurious effects
676 as present in mixed paint?

A. It has no injurious effects.

Q. What are the unfavorable effects?

A. They are not unfavorable. It simply acts as a drier. It is equal to putting that much Japan in it.

Q. Then you think the word "detriment" used by Mr. Hooker under this sample number 4—I refer to the language that "if it appears in excess, it is a detriment to many paint compositions"—has no particular bearing upon the qualities of the paint; is that what you mean?

A. No sir. You must let me know what Mr. Hooker means by excess. Excess might be 20 per cent.

Q. Well, I don't know what he means. If you can't tell from the samples, I am sure, I can't.

A. This .43 of one per cent. is a negligible quantity.

Q. There are a great many different kinds of lithophone upon the market, are there not?

A. No sir.

Q. Are there not a great many articles which pass under different names but which are generally classed as lithophone or spoken of as lithophone?

A. Not a great many, so sir.

Q. Well, how many are there?

A. About five.

Q. Name them.

A. Becton White, Jersey Lily White, Oleum White Ponolith and Lithopone.

Q. And no others?

A. None that I know of now.

Q. Did you mention Orr's White?

A. Well, Orr's White is not imported in this country any more.

Q. Do the prices of the different grades or kinds of lithophone which may be found upon the market vary a good deal?

A. No sir, almost uniform.

677 Q. And no matter whether it is found under one of the other of these different names which you have just given, the price is, you say, substantially uniform?

A. Substantially uniform.

Q. Well, is there a good deal of variation in the lithophone, in the product itself as you found it upon the market?

A. There is very great uniformity.

Q. Are soluble salts present in some of these grades?

A. In negligible quantities.

Q. Well, how low a percentage may the article contain so as to come within the definition of a negligible quantity?

A. In lithophone I should say one per cent.

Q. Then if the soluble salts that are found in lithophone are a

greater amount than one per cent., you would find it very objectionable, would you?

A. Yes sir.

Q. And it would injuriously affect the quality of a paint in which such a quality of lithophone were used?

A. It wouldn't injuriously affect it.

Q. How would it affect it?

A. It would make it dry too rapidly.

Q. And what would be the effect upon the durability of a paint if it dried too rapidly?

A. A linseed oil paint that dries too rapidly hasn't the same lease of life that a slow drying linseed oil paint has.

Q. And the same thing would be true of a paint in which lithophone had been used, where there was an excess of the soluble salts.

A. Yes sir.

Q. I understood you to say that lead can be used with lithophone in the preparation of a mixed paint?

A. Yes, sir, it is very largely used in the linoleum indus-
678 try, mixed with lithophone.

Q. And the use of lead and lithophone together in the preparation of a mixed paint is all right?

A. Provided a man knows.

Q. Well, knows what?

A. Well, knows his business, of course.

Q. Well, I am assuming that the paint is properly mixed. If it is properly mixed, there is no objection to the use of these two ingredients in combination, is there?

A. There is no objection whatever.

Q. And you can apply a coat of mixed paint in which lithophone has been used as an ingredient as a second coat over a surface which has been previously covered with mixed paint in which no lithophone has been used?

A. Yes sir.

Q. And if lead has been used as the principal ingredient in the first coat, the subsequent coat of lithophone, or of a mixed paint in which lithophone has been used, will not discolor or change its color or lose its color because of the lead in the first coat, will it?

A. No sir, not because of the lead at all.

Q. Not to — affected by it in any way?

A. No sir.

Q. Mr. Toch, I will ask you if it is true that barytes has been very extensively used as an adulterant in the preparation of mixed paint?

A. Not as an adulterant, as an assistant.

Q. Well, you read and gave your approval to an extract from the United States Geological Survey of the Mineral Resources of the United States, 1904, did you not?

A. I did.

Q. And in the quotation as given it was stated, among other things, that the addition of barytes is not as an adulterant, as was the case a few years ago; that is true, is it?

A. Whoever used it a few years ago as an adulterant didn't
679 know.

Q. But I ask you if that statement appears in the extract which you read with approval?

A. It does appear in the extract, yes sir.

Q. Do you want to be understood as differing from this author in his statements that it was used as an adulterant until a few years ago?

A. I didn't remark that I agreed with the author that it was used as an adulterant, and I said no because I remember that the author didn't say that.

Q. I will ask you if, in addition to the quotation which you have given from this same work, I read correctly in quoting the following additional paragraphs in relation to barytes: "There is considerable variation in the barytes prepared for market and it would seem to be well to establish some standard for barytes that is to be used in the manufacture of a white pigment, for a number of the impurities that are apt to occur in barytes, as silica and lime, as well as traces of iron oxide and of manganese dioxide, are highly undesirable as ingredients of paint. These variations in the quality of barytes are known and appreciated by those who grind the mineral and prepare it for market, but the purchasers of this material for pigments or other purposes have not acquainted themselves with these variations and have usually paid but little attention to testing the product." Have I quoted correctly?

A. Yes sir, you have.

Q. Do you agree with the author in that statement?

A. The author doesn't know the entire story.

Q. I ask you if you agree with him in that statement?

A. Partially.

680 Q. Do you know anything about the process of bleaching which is something applied in the preparation of barytes for use as an ingredient in the preparation of paint?

A. Only in a general chemical way.

Q. Is that bleaching process an expensive one or not?

A. I understand it is not expensive.

Q. Does it add considerably to the cost of the production of barytes to put it through this bleaching process?

A. I don't know.

Q. Do you know whether the most of the barytes that is produced in this country is put through the bleaching process?

A. I don't know.

Q. Does it add any valuable quality to barytes that it should be bleached?

A. For white paint, the whiter we have barytes the whiter your subsequent paint.

Q. Do you test barytes which goes through your factory to see whether it has gone through the process of bleaching?

A. No sir.

Q. Then when you buy barytes for us in the manufacture of

mixed paints in your factory, you don't know whether it has been subjected to this process of bleaching or not?

A. I don't.

Q. I will ask you if I read correctly from this same author as follows: "Much of that"—referring to barytes—"mined in Germany is ground and prepared for market without any bleaching, and this is also true of some of the barytes produced in this country. The bleaching process, while not an elaborate one, adds considerably to the cost of production of the first grade of barytes" I have quoted correctly, have I?

A. You have quoted correctly, yes sir.

681 Q. And you have no knowledge yourself of what proportion of the barytes which is placed upon the market and used in the preparation of mixed paints has been subjected to this process of bleaching?

A. No sir, I am not a barytes manufacturer.

Q. But, as a user of barytes in your factory, you never know, as you have already testified, whether the article that you employ has been subjected to this expensive process of bleaching or not, do you?

A. No sir; we have other tests for determining its purity, and whiteness.

Q. You are familiar with what Thorpe says in regard to barytes, as he is quoted from on page 584 of Prof. Ladd's bulletin?

A. Yes, I am familiar with that.

Q. You, however, do not agree with his conclusions?

A. No sir.

Q. And in your experience the streaky appearance does not follow where a surface has been painted with a mixed paint in which barytes has been employed as a pigment?

A. No sir.

Q. Now if, as a matter of fact, the bleaching process had not been used in the preparation of barytes, in your opinion would not the product thus obtained be liable to produce a streaky appearance when the barytes was used as a pigment in the preparation of mixed paint?

A. Not at all.

Q. I understood you to say that whiting is not alkaline.

A. No sir.

Q. Well, whiting is only one of the various substances which are included under the common or general designation of cal-

682 cium carbonate, is it not?

A. Yes sir.

Q. And are others of the substances which are included in that general name alkaline in their character?

A. Well, Paris white is mentioned, that is the same thing as whiting, only in a higher grade, a finer grade.

Q. Well, will you tell us of any substance which is included in the name calcium carbonate which is alkaline in its nature?

A. Not—none that I know of.

Q. There are none that you know of.

A. There are none that I know of.

Q. Then if any of the scientific authorities referred to upon the

former taking of evidence in this case say that one of the objections to the use of calcium carbonate in the preparation of mixed paints is because these substances are alkaline in their nature, you would not agree with those authorities?

A. I certainly would not. It hasn't any right to be alkaline.

Q. If you have a high grade of linseed oil, Mr. Toch, you don't find very much free acid in it, do you?

A. Yes sir.

Q. Doesn't that come as a rule from the presence of foul seed in the flax seed which is ground up and from which the oil is made, or because the flax seed which is used is immature and not thoroughly ripened.

A. No sir, not always. Those substances you speak of may all produce acid, but the composition of linseed oil is practically glycerid of linoleic acid and, in the nature of its composition, it has what we know as acid value. Now, if it didn't have this acid value, it wouldn't be acid.

683 Q. Do you call that a free acid?

A. Glycerid of linoleic acid it not free acid but the grycerids in this case are very frequently free.

Q. Well, there must be fee acids present in the oil in order to require the use of calcium carbonate, mustn't there?

A. They are always contained in the oil.

Q. Are there free acids contained in the highest grades and qualities of linseed oil?

A. Yes sir.

Q. Well, to what extent, what percentage?

A. Oh, that would be very small, under five usually.

Q. If you had linseed oil of the highest grade in which the free acids were present to a smaller extent than five per cent., you would not require the use of any calcium carbonate in the preparation of your mixed paints for the sake of taking up that free acid in the oil would you?

A. No sir, there are many instances in which it is not necessary, but I always do it on principle, wherever I can.

Q. If it is not necessary to do it, if there isn't enough of that free acid to require it chemically, then the use of that calcium carbonate simply increases the bulk of your paint at a very small cost, doesn't it?

A. No sir, it doesn't.

Q. Well, calcium carbonate, in most of its forms, is very much cheaper than carbonate of lead or oxide of zinc?

A. Well, but——

Q. Just answer my question, if that is true?

A. Oh, yes.

Mr. ZEISLER: You will simplify matters if you will allow
684 the witness to complete his answers and not choke him off.

Mr. WATSON: Well, he didn't answer my question.

A. I want to show you where I use it in red oxide paints which contain no lead or zinc, where the oxide itself may contain acid.

Q. Just refer to page 585 of Prof. Ladd's bulletin, Mr. Toch, will you?

A. Yes sir.

Q. I understand you to say if lithophone contained as large a proportion of zinc oxide as is shown in either of the two samples there given, it would be very objectionable in the preparation of a mixed paint.

A. I beg pardon; I didn't say that.

Q. Would it or would it not?

A. Why cartainly not.

Q. Well, didn't you say that lithophone, as it is now prepared and appears upon the market, does not contain any zinc oxide?

A. I said it does not contain as high a per cent. as is shown in the old analyses.

Q. Well, what per cent. does it contain as it now appears upon the market?

A. The last I examined contained less than two per cent.

Q. Well, speaking of it generally, what would you say is the limit of zinc oxide in the lithophone which is produced commercially and put upon the market of the country today?

A. I never reject a sample that contains as much as 5 per cent.

Q. Well, do you consider the value and the valuable qualities of lithophone as an ingredient in the preparation of mixed paint as increased by the lowering of the percentage of zinc oxide?

685 A. Yes sir.

Q. The less there is of zinc oxide in its composition, the better?

A. The better.

Q. Well, do you consider that the presence of as much as thirteen per cent. of it in lithophone impairs its value?

A. For the majority of purposes, it wouldn't do it a bit of harm.

Q. For what kinds would it do harm?

A. Where a paint was being made under one of my patents with a very acid resin.

Q. I asked you in what sort of paints the presence of 13 per cent. of zinc oxide in lithophone would be a decided objection in the quality of the paint.

A. In a paint made under one of my patents, containing resin acids.

Q. Well, in paints that are not made by the use of your patent at all, what would be the objection to the presence of as much as 13 per cent. of zinc oxide lithophone employed as a pigment?

A. None particularly.

Q. Then the evolution in the manufacture of lithophone which has resulted in the reduction of zinc oxide from the percentages shown by Hurst and appearing upon page 585 of Prof. Ladd's bulletin, down to what you say is now only two or three per cent. is of no advantage and has not added anything, generally speaking, to the valuable qualities of lithophone; is that true?

A. That is not what you asked me. The lower the percentage of zinc oxide, the more body or covering property the lithophone has.

If that is what you meant to ask me, I would say that the
686 reduction in zinc oxide increases its hiding power.

Q. Well, isn't hiding power a most valuable property in a pigment?

A. Not always.

Q. Well, for very many uses in the manufacture of paint it is a most valuable quality, isn't it?

A. That depends; not entirely.

Q. That depends upon the purpose for which you want it?

A. Yes.

Q. If you want to use a paint for purpose of obscuring or hiding the object which is covered, it is a most valuable property, isn't it?

A. I would use black or red; I wouldn't use white.

Q. I didn't ask you what you would use; I ask you to answer my question.

A. Yes sir, I will try to.

Q. Then the preparation of a mixed paint where hiding power is desired as one of the quantities, lithophone would be much more desirable where the presence of zinc oxide had been reduced to one or two or three per cent.?

A. Yes sir.

Q. Referring to silica. I understand you to say it has no tendency to run when used in the preparation of mixed paints; is that true?

A. That is true, always assuming that the correct quantity is used.

Q. Well, yes. If too large a percentage of it had been used, then it would have that tendency?

A. If too large a percentage of oil were used, it would have that tendency too.

Q. I asked you about silica; I didn't ask you about oil.

A. Well, you really cannot compound with silica without the use of oil.

687 Q. In all these cases we have assumed that the oil was used in the preparation of mixed paints, Mr. Toch.

A. That is what I say, assuming it is in the proper proportion.

Q. Silica, of course, is a very cheap article, isn't it?

A. No sir.

Q. It is, as you have already testified, however, one of the most commonly used of all adulterants by paint manufacturers who want to manufacture a cheap quality of paint.

A. I beg pardon; I have never said anything of the kind. I never stigmatized it as an adulterant in all my testimony.

Q. You never have?

A. No sir.

Q. And if any other witness has testified that silica is one of the most commonly used of all the ingredients in the making up of a paint, you would not agree with their conclusion, would you?

A. Well, that is a different question.

Q. Well, then, tell me if you agree with their conclusion.

A. I would agree with any man that said silica was very largely used.

Q. You wouldn't agree with any witness who told us that it is very largely used as an adulterant?

A. No sir.

Q. Did I understand you to say that the methods of manufacturing lithophone have been very greatly improved in the last six or seven years?

A. Yes sir.

Q. Well, has that improvement in the manufacture related to other things than the removal of the zinc oxide?

A. Oh, yes sir, it has.

688 Q. In other particulars as well?

A. In other particulars also.

A. And has that improvement in your opinion very greatly improved the valuable qualities of lithophone as a pigment?

A. Yes sir.

Q. And you would regard the lithophone now upon the market as a far more valuable pigment than the article which appeared six or seven years ago?

A. Yes sir.

Q. And has this improvement been rather more marked in respect to lithophone than it has to any of the other substituted pigments?

A. I can speak more thoroughly on the subject of lithophone because I am very greatly interested in it; more than I can of any of the other materials; I can practically say that it has made more strides in this country.

Q. In your opinion it has made greater strides than any of the other substituted pigments that you have in mind at the present time?

A. Well, you would have to relatively tabulate in order to determine that exactly.

Q. Have you changed your opinion about the standing of Professor Hurst as a scientific authority upon the subject under consideration since you gave your testimony on the former hearing?

A. I have not.

Q. And you adhere to the opinion which you gave at that time that his rank is first amongst English chemists?

A. As a scientific chemist; I specified this morning that I didn't regard him very highly as a practical chemist.

689 Q. That is a distinction which has occurred to you since you gave your former testimony, I suppose?

A. No sir, I have mentioned that a great many times.

Q. Well, you didn't mention any distinction of that kind when you gave your testimony two weeks ago, did you?

A. I wasn't asked.

Q. You don't know what kind of a grinding mill Mr. Joystad used in the preparation of the sample touching which he was testifying, do you?

A. No sir.

Q. And for aught you know he may have had a machine such as you described as yourself having in your own factory?

A. No sir.

Q. And which would satisfactorily prepare as small a quantity of mixed paint as that described by Mr. Joystad. I say, as far as your knowledge of it is concerned, that may have been true, may it not?

A. No sir, it may not have been true.

Q. Have you ever been in Mr. Joystad's factory?

A. No sir, I don't know him.

Q. You have no personal knowledge on the subject?

A. I have because I designed the mill that I use myself and there was only one made and nobody else can have a duplicate.

Q. You don't pretend to say that there are no other mills prepared in the world which are capable of being used for the same purpose for which you use that mill, do you?

A. Oh, I don't know anything about that.

Further proceedings were here adjourned until 3:00 P. M.

690 FRIDAY, *Feb. 16th,* 1906—3:00 p. m.

MAXIMILIAN TOCH, Recalled.

Cross-examination resumed by Mr. WATSON:

Q. When did you begin gathering the 56 samples referred to upon your exhibit D?

A. I believe on the 31st of January.

Q. Did Mr. Evans do the actual work of collecting these samples for you?

A. No sir.

Q. Did you consult with him in regard to them?

A. I did not.

Q. Did he have anything to do with directing you where you would get these samples?

A. No sir.

Q. Where did you get them?

A. Mr. Heath wrote a letter to the paint manufacturers of the United States, requesting them all to send me samples, quart samples of their mixed paints containing sublimed lead.

Q. Do that you understood in advance that every sample that came to you of mixed paints under that arrangement contained sublimed white lead.

A. Yes sir.

Q. And these 56 samples were all the samples that were sent you under that arrangement, were they?

A. No sir.

Q. How many were sent to you under that arrangement?

A. I had about 137 up until noon of last Wednesday.

Q. How many of these, however, were in the grays and the whites, the light colors?

A. Most of the people sent two; some sent one and some sent three samples.

Q. How many gray and white mixed paints were sent to you under that arrangement other than the 56 which are men-
691 tioned in exhibit D?

A. I didn't tabulate the colors.

Q. Well, as a matter of fact, you have selected and put upon exhibit D substantially all of the white and gray and light colored mixed paints that were sent to you under that arrangement, haven't you?

A. Yes, sir, they were all light colors.

Q. I say, you have selected and put upon Exhibit D substantially all of the samples of white and light colored mixed paints which were sent to you?

A. I did, yes sir. Mr. Watson, may I ask that the question be read to me again; I understood it was the list of analyses that you wanted.

Q. Well, that is what I asked; just read the question.

(The question and answer were read.)

A. I put all of those that it was possible to analyze.

Q. Well, how many additional samples of the white and light colored mixed paints were sent to you other than the 56 which are shown upon this exhibit D, if any?

A. The difference between 56 and 137, which would be 81.

Q. But then, many of those other were not in the light shades, were they?

A. They were all in the light shades; there was no black or dark gray or paints of that character sent.

Q. Were all of the remainder of these samples that were thus sent to you and which do not appear upon exhibit D either whites or grays?

A. No, they were either whites or light tints. Some of them were, I have one marked here lilac, and another one cream, and another one tinted white, and another one French Gray.

Q. Have you finished your analyses of the remainder of
692 those samples?

A. No sir, it was impossible to do any more than we did.

Q. Of course, you didn't do this work personally?

A. I did it personally.

Q. Well, I suppose you had help, didn't you, in your laboratory?

A. Yes, indeed; I had two assistants working with me? I did some work on every sample myself.

Q. You have not specified upon Exhibit D the other pigments which were used in connection with the sublimed white lead have you?

A. No sir.

Q. And under the designation "shade," upon each of these three shades, have you given the brands or trademark or name of the paint, or are what you have given, are they the colors as you yourself found them?

A. Simply the colors as they were marked on the label.

Q. But you don't give the brand or label of the paint itself, do you, in this exhibit?

A. I fear I don't understand you. You mean whether it shows the number of labels and the various——

Q. No. These paints come out under some trademark or brand or label, don't they?

A. Not all of them.

Q. Not all of them?

A. No sir.

Q. You have given under the designation of shade whatever name did appear upon the samples?

A. Yes sir, it is a copy of the label, the way it shades.

Q. Why didn't you bring with you the remainder of the samples which you and Mr. Lane painted in your laboratory?

A. I haven't sufficient ability nor knowledge, nor do I
693 know of anybody else who could pack 56 open quart cans fo-
transportation?

Q. I didn't ask you about the paints. I said the little boards, why didn't you bring all of those with you?

A. We brought all excepting those that were not sufficiently dry.

Q. I understood you to say that all of these samples dried within twenty-four hours so that the second coat could be applied except the three samples which came from the Minnesota Linseed Oil and Paint Company and Blood & Company?

A. Yes sir.

Q. And you regarded the slowness of drying on the part of those two samples as the most favorable quality in paints, didn't yo-?

A. No sir, I did not.

Q. W*W*ell, you regarded the fact that all the other samples that you got here dried within 24 hours as favorable to them, didn't you?

.A It is a point in their favor, yes sir.

Q. It is not generally recognized amongst paint men and painters that a slower drying quality in a paint is a good thing, is it?

A. Too slow drying do you refer to?

Q. Well, slower than 24 hours under the conditions in which it is dried.

A. It isn't a good thing, no sir.

Q. Better to dry in 24 hours.

A. Yes sir, or less.

Q. You have been employed by the Asso*f*ication of Paint Grinders have you, to make your investigations and give your testimony in this case?

A. Yes sir.

Q. How were you paid, by the day or in what way?

A. I have written Mr. Heath a letter on the subject of my compensation, in which I stated that I felt the honor of the posi-
694 tion very deeply and under no circumstances would I accept one cent for my services.

Q. So your services are rendered gra*y*uitously?

A. Absolutely.

Q. You are a member of the Paint Grinders' Association?
A. Yes sir.
Q. And out of loyalty to that association you are contributing your time, whatever you have done, without money compensation; is that the idea?
A. Yes sir. And in addition thereto I have contributed a sum of money for the defraying of the expenses of this suit.
Q. Your regular contribution?
A. Yes sir.
Q. How many are contributing in that way to the expenses of this suit?
A. I don't know.
Q. About a hundred.
A. I presume everyone.
Q. There are about a hundred of them, are there not?
A. About; perhaps less than that.
Q. 97 was it?
A. I think so; I am not sure; I have never counted the list.

Mr. WATSON: Mr. Zeisler, will you have this can produced at the hearing so that we may refer to it?
Mr. ZEISLER: Surely, surely.
Mr. WATSON: I refer to the can upon which appears the label "Minnesota Linseed Oil Paint Company, No. 67."

695 Redirect examination.

By Mr. ZEISLER:

Q. What is the proper time within which mixed paint should dry so as to present the most favorable conditions?
A. Somwhere between 16 and 24 hours.
Q. If the mixed paint dries in less than 16 hours, I understand you to say that that shortens the life of the paint?
A. Not necessarily.
Q. It might have that tendency.
A. It might have that tendency, yes sir.
Q. If it takes more than 24 hours to dry, what would be the effect?
A. Well, it would be exposed to dust and rain and atmospheric influences, which would collect on the paint and spoi- its appearance.
Q. In other words, foreign matter would have a chance to get between the first and seconc coat or between the second and third coat?
A. Yes sir.
Q. And that opportunity would be increased as the time for drying was lengthened?
A. Yes sir.
Q. Mr. Watson called your attention to the following passage in regard to barytes in the official publication of the United States Geological Survey, from which you read this morning in your testimony. "There is considerable variation in the barytes prepared for marked and it would seem to be well to establish some standard for barytes that is to be used in the manufacture of a white pigment, for

a number of the impurities that are apt to occur in barytes,
696 as silica and lime, as well as traces of iron oxide and of manganese dioxide are highly undesirable as ingredients of paint." You stated, in answer to a question of Mr. Watson, that you agreed in part with this statement in the sentence just quoted but said that that is not all of the story. Now, what is the balance of the story?

A. The wording of that particular sentence is rather poor because in the beginning of the sentence he refers to white paints and says that is to be used in the manufacture of a white pigment. Therefore it would be natural to conclude that manganese dioxide and iron oxide are not good for a white paint, which is perfectly true. But the writer does not go on to say that maganese dioxide and ferric oxide are of no hurt whatever in a dark paint. What is what I meant by the whole story.

Q. When you speak of ferric oxide you mean the same thing as iron oxide?

A. Iron oxide, yes.

Q. How about the silica?

A. Silica doesn't do any harm whatever.

Q. Is there barytes on the market which is pure from all these ingredients mentioned in this sentence?

A. Yes sir, unlimited quantities.

Q. For the darker shades of paint, would there be any objection to the use of barytes containing these additional ingredients mentioned in this sentence?

A. Not at all.

Q. This objection would only exist where the barytes was to be used in a white paint?

A. In white pigments, yes sir.

Q. Well, I mean in a white paint.

A. In a white paint.

Q. Now, is there any trouble in getting barytes of pure
697 whiteness?

A. None at all.

Q. Whether that whiteness is natural or produced by bleaching had nothing to do with the question of the whiteness, has it?

A. Nothing at all; nothing ay all to do with the question of its quality either.

Q. It has nothing to do with the value of barytes as an ingredient so far as giving permanency to the paint is concerned, has it?

A. None at all.

Q. Is there gray barytes on the market which is just as fine in quality as the pure white barytes?

A. Yes sir, there is gray barytes, light brown and cream colored barytes, all just as fine as pure white floated and absolutely as good as the white floated for colors other than white.

Q. Is there any sample among the fifteen samples of mixed paints containing sublimed white lead, with which you have made brushing tests, introduced in evidence, where the paint contained barytes?

A. Yes, sir, I recall one which I samples in the spectroscope and in the microscope, and it was the Onyx mixed paint.

Q. Look at this board marked No. 44 on the back and state whether that is the test that you refer to.

A. Yes sir.

Q. Did you approximately ascertain the amount of barytes in that paint?

A. I did not.

Q. Now, what is the working quality of that paint as shown by this test?

A. This paint No. 44 contained 42.8 per cent. of sublimed lead, and our notation on it was it worked excellentl- no settling in the can; package very old.

698 Q. From the appearance of it now, would you say that the presence of barytes in this mixed paint had a tendency to make it work streaky or slimy or livery or gritty or anything of that sort?

A. Not the slightest.

699 FRANK A. LANE, Recalled.

Examined by Mr. ZEISLER:

Q. State your full name.

A. Frank A. Lane.

Q. Are you the same Lane who testified in this case before?

A. Yes sir.

Q. Can you give us an approximate idea of the number of cans of mixed paint containing sublimed white lead that you have had occasion to examine?

A. Well, it is very difficult to give you the approximate number.

Q. Well, does the number run into the tens or into the hundreds or how?

A. Well, if I count that I manufacture myself, it runs into the hundreds of thousands.

Q. Well, that you have examined after the cans were opened, I mean.

A. Oh, no, that is different. I examined, just a short time ago, seventeen cans that contained sublimed white lead.

Q. Apart from the examination that you recently made, I mean in your former experience.

A. Oh, it runs into the thousands.

Q. Did you ever notice that the presence of sublimed white lead in mixed paint caused a tendency of the pigment to harden in the can?

A. No sir, never.

Q. Have you had recently occasion to test the settling or suspension of sublimed white lead in mixed paint in a sample which you knew to be an old sample of mixed paint?

A. Yes sir.

Q. Tell us all about that.

A. Last week, in New York, I had occasion to examine a sample containing sublimed lead to the amount of 42 per cent., that
700 sample having been made under my personal supervision about five years ago.

Q. Whose paint was it?

A. That was the Onyx Paint, made by the McLennan Paint Company of Buffalo, N. Y.

Q. How can you determine that it was made as long as five years ago?

A. One reason, the McLennan Paint Company, five years ago, adopted a system, by a code, of dating every package of materials that came out of the house. This can didn't have that date. Furthermore, the can in question had been sent by me, under instructions, to Chicago, together with 47 other cans, and the party that wanted them asked me as a favor to personally superintend the making of that paint so that I would be sure it was McLennan's regular standard Onyx formula and that it did contain the sublimed white lead. I superintended the batch of paint from which this was taken from the time it was put into the mixers until the cans were sealed, and afterwards saw them packed and shipped to the party in question and I wrote him a letter that I had complied with his request and received from him a letter of thanks.

Q. And this particular can that you examined in New York last week was out of that lot?

A. Was out of that lot.

Q. Now, what did you find in this old can of Onyx paint?

A. I found the paint in very excellent condition. I opened it myself, in the presence of Dr. Toch, and slowly dropped a small thin spatula into the can, Mr. Toch watching me, scraped it along the bottom of the can and carefully drew it out, attempting to bring out a deposit, if any, and there was no precipitate or deposit of any kind in the bottom of the package. We didn't shake the can be-
701 fore we cut the head out. It stirred up readily and at once, and was ready for application without the addition of any thinner or any pigment.

Q. Compare the tendency of sublimed white lead to harden in the can with the tendency of carbonate of lead to harden in the can.

A. Well, it is very difficult to compare them because I have never seen any settling from sublimed lead and I have always had it in the carbonate of lead, having in mind a sample of pure carbonate of lead that I had mixed up just 24 hours previous to the time of examination and found quite a heavy precipitate at that time. Therefore, I consider that comparisons are odious.

Q. How many brushing tests did you say you had made altogether, not only recently, but in your previous experience, with mixed paints containing sublimed white lead?

A. Oh, probably 20,000.

Q. Did you ever find a tendency on the part of mixed paint containing a considerable portion of sublimed white lead to work tough?

A. Yes sir.

Q. Under what circumstances?

A. Where I had deliberately overmixed, overheated and overground sublimed lead to see if I could get that effect, and I got it.

Q. Now, in any mixed paint containing sublimed white lead in either a small or a considerable quantity, not made for experimental purposes, but made for commercial uses, did you find that the paint worked tough in the brushing?

A. No sir.

Q. Did you ever find mixed paint containing sublimed lead to have a tendency to drag and set in the working?

A. No sir.

Q. Referring to the statements of Prof. Ladd, purporting
702 to be based upon quotations in some trade journals, I will ask you whether you know the market price of sublimed white lead and of carbonate of lead, not as based upon trade journals, but upon actual purchases of these articles?

A. Yes sir.

Q. What is at the present time the market price of sublimed white lead as compared with first rate quality of carbonate of lead, based upon the same manner of purchasing, that is to say: by the barrel or by the carload, whatever it may be?

A. I testified to that before, the difference being a quarter of a cent.

Q. First quality of carbonate of lead is a quarter of a cent higher than sublimed white lead in this *q*estern market?

A. Yes sir, in Milwaukee.

Q. Have you made frequent and numerous examinations of standard zinc lead white, or have you had such examinations made under your supervision for the purpose of determining whether it was variable in composition?

A. Yes sir.

Q. What have you found as to the variableness of the composition of zinc lead white?

A. I have already testified that it didn't vary to any appreciable percentage of degree.

Q. Within what limit have you found it to vary?

A. Well, within the last six years, well within five per cent.; within the last nine months, within two per cent.

Q. In making a test of the variableness of the composition of zinc lead white, is it necessary to employ chemical methods or are there other methods by which this composition can be determined?

A. We employ two methods.

703 Q. What is the second method?

A. A practical test called the rub-out. Taking a known quantity of the zinc lead white and adding to it a known quantity of some tinter—we use drop black, some use carbon and some use lamp—and testing that against our standard sample to determine if the tinting strength of the material under examination is as strong as previous shipments, or our adopted standard.

Q. That is the tinctorial test, is it?

A. That is the tinctorial test. If upon that examination we find any variation, then we make a chemical examination. If we find no variation, we are positive that the shipment contains the same percentages of lead sulphate and oxide of zinc as the previous ship-

ment or our standard. The tinting strength of a material would change if you varied the percentage of zinc or percentage of lead sulphate.

Q. Assuming that all the ingredients of a chemical compound are valuable when used in mixed paint, is the variableness in composition an objection from the point of view of the manufacturer or of the user of the paint?

A. No, it isn't. He likes to know, though, as a matter of information for himself.

Q. That can be controlled, can it not, by making a specification of the composition which this material should contain?

A. Oh, yes, and is done.

Q. And you never have any difficulty in getting just what you specify.

A. No sir.

Q. Whether that be zinc from western ores, or whether it be zinc lead white, have you any difficulty?

A. No, no difficulty.

704 Q. Suppose that you had been in the habit of using zinc from western ores containing five per cent. of lead sulphate and you should get into your factory a lot of zinc from western ores containing ten per cent. of lead sulphate. Is there a method by which you can, through adding some other substance, bring the composition of your paint up to the same that you had when you were using the zinc from western ores containing only five per cent. of lead sulphate.

A. Yes sir, a very simple method.

Q. So that, even if a manufacturer could not specify the composition of compounds which are variable and would, from time to time, get a compound in different compositions, would the manufacturer be prevented from using these compounds in these various compositions or would the paints which he would manufacture suffer thereby?

A. Not at all.

Q. The paints would not suffer.

A. No sir. There might be the isolated case which I described in my direct testimony, where he was using resin in connection with that zinc from western ores.

Q. But the most that could be said would be that the variableness in composition might inconvenience the manufacturer, isn't that it?

A. That is it.

Q. Is there any objection on the score of variableness of composition from the standpoint of the user of the paint?

A. None whatever.

Q. Is there any objection on the score of the variableness of the composition of a pigment from the standpoint of a person who would insist upon first class quality of paint?

A. No sir.

705 Q. Is it not true that you can make a first class paint, no matter what the variation in the composition may be, provided all the ingredients are valuable?

A. You can.

Q. Have you found any lack of uniformity in the color of zinc lead white in your examination of that pigment?

A. Not in late years.

Q. When you say "in late years," what do you mean?

A. The last six or seven years.

Q. Have tests been made under your supervision as to the amount of zinc sulphate contained in zinc lead white?

A. Yes sir.

Q. Going back how long?

A. About nine years?

Q. How much of a percentage of zinc sulphate do you allow or are you willing to overlook as a negligible quantity in zinc lead white?

A. Up to one per cent.

Q. How many lots of zinc lead white have you found yourself under the necessity of rejecting by reason of their containing more than one per cent of zinc sulphate?

A. Never rejected any.

Q. When you were with the McLennan Paint Company did you use New Jersey Zinc?

A. Yes sir.

Q. Large quantities, I suppose.

A. Very large quantities.

Q. Did you find that the New Jersey Zinc carried a percentage of Zinc Sulphate?

A. Yes sir.

Q. How does the percentage of zinc sulphate contained in the New Jersey Zinc compare with the average amount of zinc sulphate which you find present in zinc lead white?

—. Practically the same.

Q. Have you made many practical tests of the working qualities of mixed paint containing barytes?

A. Yes sir.

Q. Only occasional tests or numerous ones?

A. Numerous ones.

706 Q. How numerous?

A. Well, I have probably done fifteen or twenty thousand in the last ten years.

Q. Did you ever find that mixed paint containing barytes, whether in small or considerable quantities, has a tendency to be gritty or that it tended to run or cut in the paint as it runs when the paint is put on the side of a building, that the barytes is heavy like sand and runs down and produces a streaky or running or gritty appearance?

A. No sir.

Q. What has been your experience with mixed paint containing barytes?

A. My experience has been that a good grade of barytes used in mixed paint in any proportion will dry with a smooth surface without running or sagging, has no granular or grainy appearance and,

as far as cutting is concerned, I don't understand that term; therefore I don't know anything about it.

Q. You never noticed anything that you could conceive of being properly called cutting in the paint?

A. No sir.

Q. Is whiting alkaline?

A. No sir.

Q. Is white mineral primer alkaline?

A. No sir.

Q. Are you acquainted with any other form of calcium carbonate than whiting and white mineral primer?

A. Yes sir, there is Paris Whites and English cliffstone.

Q. Is any other form or calcium carbonate than whiting and white mineral primer alkaline?

A. None that I have ever seen, excepting a by-product from a soap works which was one time offered to me and it was supposed to be calcium carbonate. I am not sure as to that, I didn't make an analysis, but it was alkaline, a very poor product and I didn't interest myself in it.

707 Q. And you rejected it?

A. Yes sir.

Q. Does silica have a tendency to run or sag or present any other objectionable quality when used as a pigment in mixed paint?

A. No sir.

Q. Compare the oil taking properties of silica and carbonate of lead.

A. The grade of silica that I am most acquainted with takes a trifle over three times as much linseed oi- as a good grade of carbonate of lead.

Q. Do you find a high degree of oil taking property to be a valuable quality?

A. Yes sir.

Q. In what regard?

A. If it carries a high percentage of oil it must of necessity be a very fine pigment, the particles must of necessity be very small, with the result that we get more particles on a given surface when we use it as a paint, making a better protection for the oil, and as the oil is a very necessary ingredient in the preparation of a mixed paint, we increase our oil-carrying qualities of our paint in the ratio in which we add the silica, as compared with carbonate of lead, and in that respect it resembles and is close to oxide of zinc; a good grade of oxide of zinc, the statutory zinc, for instance, carries about the same amount of linseed oil as the silica which I am describing and that is a very excellent quality.

Prof. Ladd, in his examination, stated that a combination between barytes and linseed oil would not be as elastic and would be more ready to crack than a combination between carbonate of lead and linseed oil. What is your judgment on this question?

708 A. The Professor is mistaken; it is the other way around. Barytes and the linseed oil would be the more elastic and would no- crack as readily as the carbonate of lead.

Q. Is sublimed white lead crystaline or is it amorphous?
A. It is amorphous.
Q. Have you ever found barytes in paint to work what the painter calls slimy or livery or streaky?
A. No sir, it is the very opposite.
Q. I think you have a personal acquaintance with Prof. Hurst, have you not?
A. Yes sir.
A. Have you been at his laboratory?
A. No sir, not at his laboratory. I met him on several occasions in London, met him at the laboratory of Dr. Thorpe, but not at his own laboratory.
Q. Can you tell us whether Prof. Hurst basis his opinions of the working qualities of paints upon tests and examinations made by himself?
A. Well, that I couldn't say, but he isn't a practical paint manufacturer and told me so. He is a chemist; teacher and consulting chemist.
Q. Have you ever made a test of the working quality of a paint containing nothing but barytes and linseed oil?
A. Yes sir, I described than in my last testimony.
Q. And how did it work?

Mr. WATSON: Objected to for the reason that the witness says he has already testified fully on this subject.

Q. Did you testify heretofore how this paint worked under the brush?
A. No sir, I testified as to its life and appearance.
Q. Testify now as to how it would work under the brush,
709 A. It worked very freely under the brush, flowed out nicely, had a very fine tooth and it was the direct opposite to being slim-.
Q. How about being livery?
A. There was no indication of any livery substance present.
Q. How about being streaky?
A. It wasn't streaky.
Q. Was it gritty?
A. No sir.
Q. Did it sag?
A. No sir.
Q. Did it run?
A. No sir.
Q. Did it cut?
A. I didn't see it cut anything.
Q. I think you told us that you never found sublimed white lead used in mixed paint to have the quality of tough working. I will ask you whether it has a tendency to drag and set, as Mr. Joystad called it.
A. No sir.
Q. Mr. Joystad informed us that the objection which he had to the use of zinc lead white as a pigment in mixed paints was that it is

crystalline and that after grinding it, in a few years it becomes back to crystal again; what do you say about that, Mr. Lane?

Q. Mr. Joystad is wrong; it is not crystalline; it is amorphous.

Q. Did you ever fine zinc lead white assumes crystal shape after grinding?

A. No sir.

Q. How about the whiteness of zinc lead white?

A. It is not as white as other pigments, but still there is no objection to using it in white mixed paint; a very fine white can be made.

Q. Using it in a certain proposition?

A. Yes sir.

Q. Not as the exclusive white pigment, if you intended to make a very white paint?

A. No, by the addition of some zinc or by the addition of some carbonate of lead, or using it straight and a slight addition
710 of ultramarine blue, it would throw it into a bluish cast which, when exposed to the air, would bleach to a very pretty white.

Q. How about using it in any paint other than the one intended to be a pure white?

A. No objection at all, where the white pigment would be used of that class, an opaque white pigment.

Q. Have you used lithophone in connection with lead?

A. Yes sir.

Q. Have you found any objection to it in that connection?

A. Not in the lead I used it with, no sir.

Q. Have you ever found any occasion to use copper pigments in the mixed paints that you made?

A. No sir.

Q. Have you ever found any occasion to use copper pigments in the mixed paints that you made?

A. No sir.

Q. Is there such a thing as copper pigments used by paint manufacturers?

A. Not that I know of.

Q. You heard the recital in my examination of Dr. Toch this morning on the manner in which Mr. Joystad made an experimental samples of mixed paint containing sublimed white lead in equal proportions with carbonate of lead and oxide of zinc?

A. Yes sir.

Q. From your experience, is it possible that the experimental sample spoken of by Mr. Joystad was made properly, if it had the objections which Mr. Joystad found to it?

A. It was not made properly.

Q. What fault do you find with it, so far as Mr. Joystad testified to it, or what do you assume must have been the trouble with it?

A. It probably was not ground——

Q. The grinding was not according to Hoyle, was it?

A. No sir, not according to the method of manufacturing
711 paint. As a matter of fact? I don't think any practical paint maker would attempt to demonstrate the good or bad qual-

ities of a pigment by the use of sufficient — to make one gallon, which would be approximately only ten pounds of all the pigments contained in the package and if it was used in the proportions which he said, 3 1/3 pounds of any pigment would not be considered as being a practical test. It is more like playing with it, rather than a demonstration or ssatisfying yourself?

Q. You heard the testimony of Dr. Toch regarding the brushing tests made on the 20 boards which were introduced in evidence as Complainants' Exhibits 1 to 20 both inclusive?

A. Yes sir.

Q. State whether the testimony given by Mr. Toch regarding the circumstances and conditions under which these tests were made and regarding the placing of the labels on the back thereof respectively was in every respect correct?

A. It was. I have signed the labels on the back of the board as being correct.

Q. As being the labels belonging to the paints that were applied on the board?

A. Yes sir.

Q. Of the board on which that label is pasted, is that right?

A. That is right, and I personally numbered the boards when the tests were being made. There is one feature in connection with the test which Mr. Toch omitted.

Q. Give it to us.

A. That is the examination of the packages themselves before we opened them, reading the directions as to use, where directions were printed on the labels, and the fact that we followed those
712 directions, where directions were given, exactly as set forth on the label and the fact that it was the regular label of that maker's mixed paint.

Q. What did you do for the purpose of equalizing conditions so far as cleaning od the brush was concerned?

A. We used six brushes in the test. Before using them at all, after purchasing them from the store, we washed them all carefully with pure turpentine, dusted out the loose bristles and laid them aside in a warm place for the turpentine to evaporate, having our brushes all dry and clean. After using a brush, we would immediately wash it in three separate washings of turpentine and lay it away to dry out in the same way, which would be used again at the sixth sample, and so using them all in that way, rotating, if you would like to put it that way, and carefully washing each brush and determining that there was no trace of the former paint, that the brush was perfectly clean and free from pigment or turpentine itself, endeavoring to make the test just as fair as it was possible to do.

Q. The six brushes were all of the same kind?

A. All of the same size and kind.

Q. Of course the atmospheric conditions, temperature, etc., were the same in regard to the brushing tests?

A. All the same.

Q. Was there any samples that you could identify as having been old other than that McLennan sample?

A. There were several samples that looked old. Of course, we couldn't tell how old they were. There were several of them that had an old appearance. For instance, the sample of the
713 Acme White Lead & Color Company. I believe it is No. 3, the label was stained by rust; the paste used on the label had attached the iron of the tin and it has rusted through, and also the seams of the can were somewhat rusted where the tin was broken in seaming, indicating that the package had been on the shelves or in the warehouse or some place for some considerable time. And the same applied to No. 2 if I have got the number correctly. I know the name that is the Forest City, Cleveland; that also looked to be a very old package.

Q. And what did you find as to hardening or settling in the can?

A. There was no hardening or settling in any of the fifteen samples that we painted out of.

Q. Now, then, these labels that you pasted on the back of these boards show your conclusions as to the working qualities of the paint, do they?

A. Yes sir.

Q. And you have heard the testimony of Mr. Toch in regard to the working quality of these various paints tested on these twenty boards, have you?

A. Yes sir.

Q. And did you agree with his statements made here in that regard?

A. Yes sir, and I applied the paint on these particular boards.

Q. Was that sample of paint of the Minnesota Linseed Oil Paint Company shown on the board marked D, of recent date so far as you could discover from the label on the can?

A. It looked like a fresh package of paint.

Q. Wasn't it dated?

A. I wouldn't be sure about that. One of the packages was marked Jan. '06.

Q. Well, which one was that? Refresh your recollection.

714 A. That I couldn't swear to.

Q. You say "one of the packages;" which two have you in mind when you say "one of the packages"?

A. T. L. Blood and the Minnesota Linseed Oil Paint Company.

Q. One or the other of these two was plainly marked January '06; is that what you mean to be understood as saying?

A. Yes sir.

Q. What is the proper time that it should take mixed paint to dry?

A. Under favorable conditions a mixed paint should dry within twenty-four hours, ready for the next coat.

Q. Is it an objection if paint does not dry within 25 hours?

A. Yes it is.

Q. What is the objection?

A. The exposed coat gathers dust and dirt and it is very liable to be injured by rain storms and presents a very poor surface for second coating or third coating.

Q. The longer the interval between the first and second coat the

greater the liability to harm from such outward and untoward conditions?

A. Yes sir.

Q. Do not little bugs or worms or insects of that kind stick to the surface of the paint while it is wet?

A. Oh yes, flies and gnats is what you mean, I suppose.

Q. Very well, then put it that way.

715 Cross-examination.

By Mr. WATSON:

Q. Of course, as you have already testified, Mr. Lane, you are not a chemist yourself?

A. That is so.

A. And, taking the kind of mixed paint which you have not yourself prepared, you would not be able to tell by examining it, whether it contains sublimed lead as a pigment, would you?

A. No, I wouldn't, as a matter of fact.

Q. Then, when you say that you have tested a great many samples of mixed paint in which sublimed white lead was used as a pigment you rely upon somebody else's assertion or statement that such is the fact, do you?

A. Only in the case of these fifteen sample boards. The other cases I had seen it and in many cases, had put it in myself personally.

—. Then outside of these sample boards you had never made any tests or examinations of paint coming from any other factory than the one with which you were connected, did you?

A. Yes, I did, Mr. Watson.

Q. You mean that you had been in some other factory and seen the sublimed white lead used?

A. Yes sir.

Q. And then had tested or tried this product?

A. Yes sir.

Q. Now, then, in how many cases did that occur? How many samples, in other words, of mixed paint containing sublimed white lead, in the manufacture of which you yourself had seen the sublimed white lead employed, did you make the subsequent examinations or tests of the product?

A. Well, at seven different factories.

Q. How recently did you do that?

716 A. Between the 15th of March and the 16th of April last year.

Q. That was in connection with this legislation, was it, in North Dakota?

A. No sir, that was in connection with the visits that I paid to paint manufactories which I described in my first testimony.

Q. Within the past seven years, I understood you to say Zinc Lead White has not shown a greater variation than about five per cent. in its constituents?

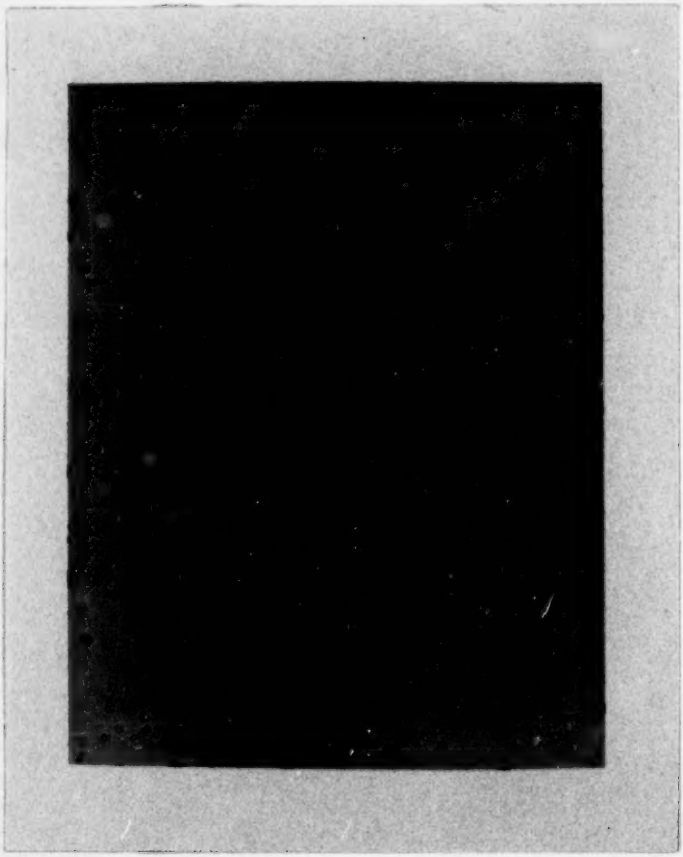
A. That is the material as coming into our factory, yes sir.
Q. And prior to seven years ago, how great was the variation?
A. That I don't know.
Q. You have no knowledge how great it was prior to that time?
A. No sir.
Q. Then you have only known anything about zinc lead white as a pigment in the preparation of mixed paint during the past seven years, have you?
A. I tried it first nine years ago, but I didn't adopt it or use it in the factory until about, well, it is a little over seven years ago, practically seven years ago.
Q. It wasn't satisfactory as a pigment when you first tried it nine years ago, was it?
A. Yes, it was satisfactory.
Q. Well, but you say you didn't adopt it at that time?
A. No, didn't adopt it.
Q. Well, you must have had some reason for not adopting it.
A. I had; one reason was we were contracted for lead corbonate, oxide of zinc and sublimed white lead for a year's supply.
Q. Well, was the variation in the constituents of zinc lead white, when you examined it nine years ago, greater than it was
717 when you began using it seven years ago?
A. I have already stated that I couldn't tell you because I only had the one lot. I had nothing to compare it with.
Q. Well, from your knowledge of the development of the process employed in the manufacture of zinc lead white, has it been developing and producing a less variable product from year to year?
A. I believe it has, yes.
Q. Then you would say it probably did vary more nine years ago in its constituents than it did seven years ago?
A. It might; I don't know.
Q. And I understood you to say that within the past nine months the process had been perfected up to the point where it now shows a variation of one or two per cent. Is that right?
A. That is right.
Q. There isn't any trouble in employing lithophone in connection with carbonate of lead in making a mixed paint, is there?
A. I didn't say so.
Q. Well, I ask you if there is.
A. I don't know of any.
Q. Is there any objection to using a mixed paint in which lithophone is employed as an ingredient in the form of a second coat of paint upon a surface which has been previously painted with mixed paint in which carbonate of lead has been used without lithophone?
A. Not to my knowledge.
Q. Of course, in making these tests with Prof. Toch, the results of which are embodied in the exhibits introduced in evidence, you do not certify to the presence of sublimed white lead in any of the samples?
A. Only in the one numbered 44.

718 Q. The one which came from the McLennan Company?
A. Yes sir.

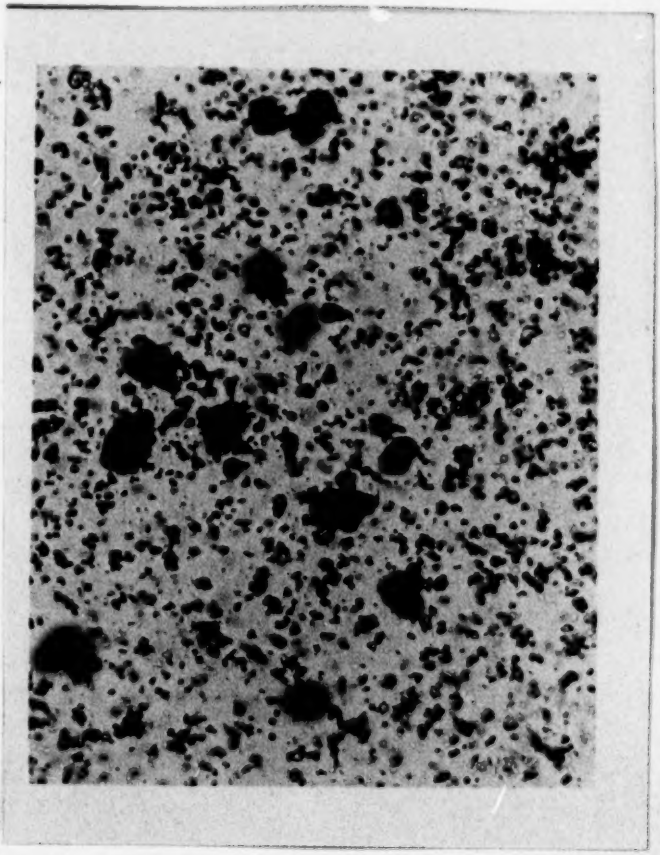
Q. And beyond that you simply rested yourself upon the analysis of Mr. Toch?
A. I can't say as to that.
Q. Well, I mean you don't pretend to know anything about it?
A. No sir, no sir.

Complainants rest.
Testimony closed.

719 COMPLAINANTS' EXHIBIT B.



720 COMPLAINANTS' EXHIBIT C.



721 COMPLAINANTS' EXHIBIT D.

Name.	Shade.	Sublimed lead, %.
The Buffalo Oil, Paint & Varnish Co., Buffalo, N. Y.	#62 Tinted White	46.1
The Forest City Paint & Varnish Co., Cleveland, O.	Outside White	47.8
The Acme White Lead & Color Works, Detroit, Mich.	Outside White	98 8
The Vaughan Paint Co., Cleveland, O.	Outside White	24.1
Louisville Lead & Color Works, Louisville, Ky.	French Gray	35.2
Lincoln Paint & Color Co., Lincoln, Neb.	Outside White	88.8
Boydell Brothers White Lead & Color Co., Detroit, Mich.	Outside White	35.1
Patton Paint Co., Milwaukee, Wis.	Pearl Gray	18.2
John Briggs & Co., Boston, Mass.	Outside White	33.3
Alston Mfg. Co., Chicago	965	31.9
The O'Neill Oil & Paint Co., Milwaukee, Wis.	#1 Cream	62 2
A. B. McNairy & Co., Cleveland, O.	#28	23.7
Kent & Purdy Paint Co., St. Louis, Mo.	Outside White	94.8
Lincoln Paint & Color Co., Lincoln, Neb.	#51 Lilac	84.4
Adams & Elting Co., Chicago	Outside White	33.9
Bradley & Vrooman Co., Chicago	Outside White	35.5
Detroit White Lead Works, Detroit, Mich.	Outside White	40 0
Hughes-Purcell Paint Co., Kansas City, Mo.	#3	21.2
Platt & Thornburgh Paint Co., St. Louis, Mo.	Outside White	35.7
The Forest City Paint Co.	#201 French Gray	
The Patton Paint Co., Milwaukee, Wis.	H. W. Johns White	17.4
Harrison Brothers & Company, Philadelphia, Penna.	White Paste	48.0
The Rubber Paint Co., Chicago	#123	33.2
The Felton-Sibley Co., Philadelphia, Penna.	Outside White	14.36
The McLennan Paint Co., Buffalo, N. Y.	#115	39.5
722 Becker-Moore Paint Co., St. Louis, Mo.	Outside White	35.2
The Tripod White Lead Co., Atlanta, Ga.	White Lead	12.1
The Revere Paint Co.	Outside White	8.0
Hecht & Zummach, Milwaukee, Wis.	#56 Weatherproof	23.4
J. F. Kurfees Paint Co., Louisville, Ky.	French Gray	25.76
Howe Paint Co.	#74 Outside White	27.9
Buckeye Paint Co., Toledo, O.	Outside White	
Detroit Graphite Mfg. Co., Detroit, Mich.	Gray Liquid	76.9
F. J. Cooledge & Bro.	R. M. White	28.3
Rocky Mt. Paint Co	Outside White	
Bass Heuter Paint Co., San Francisco, Cal.	Outside White	
McPhee & Mcginnity, Denver, Colo	#720 Pear/Gray	
Columbian Mixed Paint Co.	#51	
The Allentown Mfg. Co., Allentown, Penna.	Cottage No. 5	4.76
Eagle Paint Company	#27	71.64
True Tagg Paint Company, Memphis, Tenn.	Outside White	22.6
B. L. James Mercantile Co., Denver, Colo.	Flesh Color	48.4
McLennan Paint Co., Buffalo, N. Y.	White	42.8
A. Wilhelm Co., Reading, Penna.	O. W. Semi Paste	19.4
Humphrey Jones Mercantile Co., Denver, Colo	Outside White	41.6
McLennan Paint Co., Buffalo, N. Y.	White Paste Outside	63.4
Eugene E. Nice, Philadelphia, Penna.	Outside White	97.6
Warren Paint Co., Warren, O.	Silver Gray No. 91	
John Lucas & Co., Gibbsboro, N. J.	Outside White	
Hoffman-Richardson Co., Boston, Mass.	#160	
Charles H. Howell & Co., Philadelphia, Penna.	Outside White	
Waterproof Paint Company, Long Island City	Outside White	42.7
723 Hammond Paint Works	Pure Gray #20	23.2
Montgomery Ward, Chicago	Outside White	27.3
Sherwin-Williams Co., Cleveland, O.	Flat White	40.0

724 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

I hereby certify that, in accordance with the order of appointment and stipulation of counsel issued pursuant thereto, I was attended by counsel of the respective parties in the case of Heath & Milligan Manufacturing Company, *et al., vs.* J. W. Worst, on the 22nd day of January, 1906, in the city of Chicago, state of Illinois, and did then and there, at said time and place, and at certain other times and places mentioned, take and report all of the testimony of all of the witnesses produced by either side and the proceedings therewith connected. That at all of said times and places each of the several witnesses, being of lawful age, before testifying, was duly cautioned and sworn to tell the truth, the whole truth and nothing but the truth, relative to the matters in controversy in this cause. That the report to which this certificate is affixed contains a true, full and complete record of all testimony taken, exhibits introduced and proceedings had at such times and places.

In Witness Whereof, I have hereunto set my hand this 21st day of February, In the Year of Our Lord One Thousand Nine Hundred and Six, and of the Independence of the United States of America, the One Hundred and Twenty-ninth.

JESSIE S. CONOVER,
Special Master.

Filed Feb. 21, 1906.

J. A. MONTGOMERY, *Clerk.*

725 Thereupon afterwards, to-wit: on the 23rd day of February, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 32 of the Journal of this Court for the Southeastern Division:—

(500.)

"HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The motion of the complainants for a temporary injunction coming on for further hearing before the court at this time, upon the testimony taken before the Special Master and filed herein, and the arguments not being concluded at the hour of adjournment, the hearing is continued to tomorrow morning."

That afterwards, to-wit: on the 24th day of February, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 33 of the Journal of this Court for the Southeastern Division.

(500.)

"HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The motion of complainants for a temporary injunction coming on for further hearing before the court at this time, after hearing arguments of counsel and due consideration, it is ordered that said motion be, and the same hereby is denied, and it is further ordered that the restraining order heretofore issued herein be, and the same hereby is vacated and set aside."

726 Thereupon afterwards, to-wit: on the 2nd day of March, A. D. 1906, Demurrer and Answer was filed in this cause, which Demurrer and Answer is in words and figures following, to-wit:—

"UNITED STATES OF AMERICA, *District of North Dakota, ss:*

Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The demurrer of the above named defendant, John H. Worst, to Paragraphs 1 to 16, both inclusive, and paragraphs 18 to 37, both inclusive, of the bill of complaint herein.

This defendant by protestation, not confessing or acknowledging all or any of the matters or things in the said above named paragraphs in the said bill of complaint contained to be true, in such manner and form as the same are herein set forth and alleged, doth demur to the same; and for cause of demurrer showeth:

1st. That it appeareth by complainant's own showing in said paragraphs named that complainants were not, at the time of the commencement of said suit, and are not now, within the jurisdiction of the State of North Dakota, in such manner as to bring them within the last clause of the Fourteenth Amendment to the Constitution of the United States forbidding any state to "deny to any person within its jurisdiction the equal protection of the laws."

2nd. That it appeareth said paragraphs of the bill are not sufficient, and do not state facts sufficient to entitle complainants to the

relief sought, or to any relief in this suit, and that by com-
727 plainant's own showing in said paragraphs, they are not entitled to the relief prayed in the bill against this defendant.

R. N. STEVENS &
BALL, WATSON & MACLAY,
Solicitors for Defendant, John H. Worst,
Fargo, North Dakota.

JNO. S. WATSON.
Of Counsel.

Dated March 2nd, 1906.

I hereby certify that the foregoing demurrer is in my opinion well founded in point of law.

R. N. STEVENS &
BALL, WATSON & MACLAY,
Solicitors for Defendant, John H. Worst.

JNO. S. WATSON,
Of Counsel.

STATE OF NORTH DAKOTA, *County of Cass, ss:*

John H. Worst being duly sworn deposes and says: I am the above named defendant; the foregoing demurrer is not interposed for delay.

J. H. WORST.

Subscribed and sworn to before me this 2nd day of March, 1906.

MATHEA NYMON,
[SEAL.] *Notary Public, Cass County, North Dakota.*

My commission expires Nov. 1, 1909.

728 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The Answer of the Above Named Defendant to Paragraph 17 *of the Bill of Complaint of the Above Named Complainants.*

In answer to the said paragraph of said bill, I, John H. Worst, say as follows:

1. I admit the manufacture of paint, and more particularly of mixed paint, involves many practical problems, the proper solution of which demands the application of a variety of scientific principles, and is the result of a variety of practical tests and experi-

ments, and that the means, methods and processes employed in such manufacture have changed materially in the course of years to conform to the discovery of new scientific facts and the results of practical experiments. I admit that the technology of paint manufacture has made a gradual and constant progress during the past fifty years, during which time it has undergone an evolutionary process, but I do not know and cannot set forth whether such process is still far from completed. I admit that formerly carbonate of lead was the only material*ly* which was universally accepted as the proper pigment to be used in paints requiring or admitting of the use of a white pigment; and I admit that oxide of zinc has gained general recognition as being in many cases appropriate as a like pigment, and that it has not come to be *i*niversally conceded as possessing important useful qualities as a white pigment not possessed by carbonate of lead; but I deny that such general recognition and such general use of oxide of zinc has only come within
729 the past twenty-five years, and on the contrary, I aver that it has been th*is* generally recognized and used for a period of about thirty years prior to this time.

2. I admit that — the results of tests and experiments it has been demonstrated that there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection with, and in other cases may be — instead thereof; but I deny that such materials either without carbonate of lead or oxide of zinc, or in combination with one or both of these, are as efficient as, or in any respects more efficient than, carbonate of lead or oxide of zinc, or a combination of the two, for the purposes for which the latter are used in paint, and on the contrary I allege that sufficient tests and examinations have not yet been made, and sufficient time has not yet elapsed since their production as articles of commerce, to determine or demonstrate the value and useful*l*ness of sublimed white l*a*w*d* or of zinc, lead white or of lithophone, (so called in the bill); and I allege that thus far the use and value of each of said last named materials for the purpose aforesaid have not progressed beyond the experimental stage; I aver that there are about one hundred leading paint manufacturers in the United States each of whom prepare and market annually one hundred thousand gallons, or more, of mixed paints, and I alleg- upon information and belief that about one-half of such leading paint manufacturers are not convinced of the usefulness, value or efficiency of sublimed white lead, zinc lead white, or lithophone, for the purposes aforesaid, and that they entirely reject them as pigments in the preparation of mixed paints; that some of said manufacturers *o*s reject them because as the results of tests made by them, or under their supervision, such materials have proved to be unsatisfactory and inefficient as pigments in the preparation of mixed paints; and other of said manufacturers exclude them and refuse to employ them for the purposes aforesaid, for the reason that a sufficient time has not yet elapsed since such materials appeared upon the market as articles of commerce, within which to properly test, determine and demonstrate their value as ingredients of mixed paints. I admit that zinc made

from Western ores is a useful, valuable and efficient material
730 as a pigment in the preparation of mixed paints, provided sulphate of lead incidental to its production, does not exceed in quantity five per cent. of its constituent elements; and I allege that the presence of more than five per cent. of the sulphate of lead in the zinc injures and lessens its efficiency and value for the purposes aforesaid; I allege that the proportions or percentages of sulphate of lead present in zinc made from western ores, is widely variant, and lacks uniformity, and that the presence of more than five per cent. of sulphate of lead destroys its commercial purity as oxide of zinc.

3. In answer to the averments of subparagraph *b* of paragraph 17 of the Bill, I admit that in the preparation of mixed paints possessing certain colors, towit: vermilion, certain shades of blue, myrtle green, sjylight green, golden olive, brown, crimson and tuscan red, it is necessary to employ some of the articles mentioned in said paragraph *b*, in connection or in combination with some pigment other than carbon-te of lead, and that the coloring power of carbonate of lead, if in such cases employed as a pigment, would modify and change the exact shades sought to be produced; but I allege upon information and belief that the aggregate of all mixed paints produced, sold and consumed in North Dakota in the preparation whereof it is necessary to exclude carbonate of lead, and to include one or more of the substituted materials mentioned in said paragraphs "*a*" and "*b*," does not exceed about twenty-five per cent. of the aggregate of all mixed paints which may be prepared and produced by the use alone as pigments of carbonate of lead and oxide of zinc. Save as thus admitted, I deny that there are certain white pigments other than carbonate of lead and oxide of zinc, to-wit, sulphate of barium, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, or others, which constitutes proper or useful ingredients of paint, or that said materials if so used in combination with carbonate of lead or oxide of zinc, or a combination of the same, or in connection with the substituted pigments described
in said subparagraph "*a*," whether as substitutes for carbon-
731 ate of lead, or otherwise, furnish to the paint wherein used, important, or any, useful qualities not possessed by either carbonate of lead or oxide of zinc. And save as above admitted, I deny the efficiency or value as ingredients in the preparation of mixed paints, of any of the materials mentioned in said subparagraph "*b*," and deny that under any conditions they, or any of them, serve a useful purpose, or under proper, or any, use, increase the durability or density of the paint.

4. Further answering paragraph 17 of the Bill, I aver the fact to be that in the manufacture of mixed paints in the United States at this time, the chief use of the materials mentioned in said subparagraph "*b*" of the bill is to cheapen and adulterate the paints wherein they are employed; that of all known substances and materials they are in their nature the best adapted, and lend themselves most readily to the adulteration of, and are most commonly used as adulterants and cheapening ingredients in the preparation

of mixed paints. I further aver that about 70 to 75 per cent. of all the paints used in this state are mixed paints, as defined in the Bill, and that the cheapening and adulteration of said mixed paints has become and is a great evil. That many manufacturers in the preparation of their mixed paints use as ingredients great quantities of the materials, or some or more of them, described in sub-paragraph "*b*," all of which are very cheap, and none of which are commercially worth more than one-half to one cent per pound, and so use them in lieu of and as substitutes for carbonate of lead and oxide of zinc, which are worth four and a half to seven cents per pound, and in many cases label their products as pure white lead, or pure white lead in oil, or pure mixed paints made of lead and oil. By reason thereof frauds and deceptions are perpetrated upon the public. That no other substance- have been discovered or known, which by their inherent qualities lend themselves so readily to, or are so
732 commonly employed for, such purposes of fraud and deception as those described in said sub-paragraph "*b*."

J. H. WORST, *Defendant.*
R. M. STEVENS,
BALL, WATSON & MACLAY,
Solicitors for Def't.

JNO. S. WATSON,
Of Counsel."

Upon the back of said Demurrer and Answer appear endorsements in words and figures following, to-wit:

"U. S. Circuit Court, No. Dakota. Heath & etc. against Worst. Demurrer and Answer. R. N. *D*tevens, Ball, Watson & Maclay, Sol. for Def't. Rooms 12 12A, 13 and 14, Stern Building, Fargo, North Dakota. Filed March 2, 1906, J. A. Montgomery, Clerk."

Thereupon, afterwards, to-wit: on the 13th day of April, A. D. 1906. Replication was filed in this cause, which Replication is in words and figures following, to-wit:

733 UNITED STATES OF AMERICA,
District of North Dakota, ss:

In the Circuit Court of the United States, in and for the Eighth Circuit, District of North Dakota, South Eastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

These replicants, Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, Bradley & Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead & Color Works, Detroit White Lead Works, Devoe & Raynolds Company,

William H. Lucas, Albert Lucas, and Harrison Brothers & Company, saving and reserving to themselves all and all manner of advantages of exception which may be had and taken to the manifold errors, uncertainties and insufficiencies of the answer of the defendant, J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, for replication threunto say that they do and will aver, maintain and prove their said bill to be true, certain and sufficient in the law to be answered unto by the said defendant, and that the answer of the said defendant is very uncertain, evasive, and insufficient in law to be replied unto by these replicants; without that, that any other matter or thing in the said answer contained, material or effectual in the law to be replied unto, and not herein and hereby well and sufficiently replied unto, confessed, or
734 avoided, traversed, or denied, is true; all which matters and things these replicants are ready to aver, maintain, and prove as this honorable Court shall direct and humbly pray as in and by their said bill they have already prayed.

HENRY L. STERN,
SIGMUND ZEISLER,
SPALDING & STAMBAUGH,,
Solicitors for Complainants.

Upon the back of said Replication appear endorsements in words and figures following, to-wit:

"Circuit Court of the United States. Eighth Circuit, District of North Dakota, Southeastern Division. Heath & Milligan Mnfg. Company, *et al., vs.* J. H. Worst. Replication. Henry L. Stern, Sigmund Zeisler, Spalding & Stambaugh, Solicitors. Filed Apr. 13, 1906, J. A. Montgomery, Clerk."

735 Thereupon afterwards, to-wit: on the 13th day of April, A. D. 1906, Stipulation was filed in this cause, which Stipulation is in words and figures following, to-wit:—

"UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

It is hereby stipulated by and between the solicitors for complainants and solicitors for the defendant, that this cause be submitted for final hearing and decree upon the bill of complaint, the answer of the defendant to paragraph 17 of said bill, the replication of complainants to said answer, and the demurrer of said defendant to the remainder of said bill, and upon the affidavit

of E. F. Ladd filed in said cause, and upon the evidence taken herein and reported to the Court, pursuant to the special order of reference entered herein on the 8th day of January, 1906.

HENRY L. STERN,
SIGMUND ZEISLER,
B. F. SPALDING,
W. S. STAMBAUGH,
Solicitors for Complainants.
R. N. STEVENS, *Ass't Att'y Gen.*
BALL, WATSON & MACLAY,
Solicitors for Defendant."

Upon the back of said Stipulation appear endorsements in words and figures following, to-wit:—

"#500. Circuit Court of the United States, Eighth Circuit, District of North Dakota, South Eastern Division. Heath & Milligan Mfg. Co., *et al., vs.* J. H. Worst. Stipulation. Henry L. Stern, Sigmund Zeisler, Spalding & Stambaugh, Solicitors for Complainants. Filed Apr. 13, 1906, J. A. Montgomery, Clerk."

736 Thereupon afterwards, to-wit: on the 14th day of April, A. D. 1906, the following proceedings were had in said cause, which appear of record on page 79 of the Journal of this Court, for the Southeastern Division:—

(500.)

"HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

This cause came on to be heard at this term and was argued by counsel, and thereupon, upon consideration thereof, it was ordered, adjudged and decreed that the bill of complaint herein be and the same is hereby dismissed, for want of equity, at complainants' costs."

Thereupon afterwards, to-wit:—on the 14th day of April, A. D. 1906, Petition for Appeal was filed in this cause, which Petition for Appeal is in words and figures following, to-wit:

737 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH & MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

The above named complainants, Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, Bradley & Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead & Color Works, Detroit White Lead Works, Devoe & Raynolds Company, William H. Lucas, Albert Lucas, and Harrison Brothers & Company, conceiving themselves aggrieved by the final decree, order and judgment entered in the above entitled cause, on April 14th, 1906, wherein and whereby it was ordered, adjudged and decreed that the bill of complaint in said cause be dismissed for want of equity at complainants' costs, do hereby appeal from said order, decree and judgment to the Supreme Court of the United States; and they pray that this, their petition for their said appeal, may be allowed and that a transcript of the record, proceedings and papers upon which said
738 final decree, order and judgment was made, duly authenticated, may be sent to the Supreme Court of the United States.

And now at the time of filing this petition for appeal said complainants, as appellants, file an assignment of errors setting up separately and particularly each error asserted and intended to be urged in the Supreme Court of the United States. And your petitioners will ever pray.

HEATH & MILLIGAN MANUFACTURING COMPANY,
THE SHERWIN-WILLIAMS COMPANY,
BRADLEY & VROOMAN COMPANY,
PATTON PAINT COMPANY,
JOHN W. MASURY & SON,
ACME WHITE LEAD & COLOR WORKS,
DETROIT WHITE LEAD WORKS,
DEVOE & RAYNOLDS COMPANY,
WILLIAM H. LUCAS,
ALBERT LUCAS, AND
HARRISON BROTHERS & COMPANY,
By HENRY L. STERN,
SIGMUND ZEISLER,
SPALDING & STAMBAUGH, *Their Solicitors.*

739 Upon the back of said Petition for Appeal appear endorsements in words and figures following, to-wit:—

"#500. Circuit Court of the United States, Eighth Circuit, District of North Dakota, Southeastern Division. Heath & Milli-

gan Mfg. Co., *et al.*, *vs.* J. H. Worst. Petition for Appeal. Henry L. Stern, Sigmund Zeisler, Spalding & Stambaugh, Solicitors. Filed, Apr. 14, 1906, J. A. Montgomery, Clerk."

Thereupon afterwards, to-wit: on the 14th day of April, A. D. 1906, Assignment of Errors was filed in this cause, which Assignment of Errors is in words and figures following, to-wit:

740 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

And now come Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, Bradley & Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead & Color Works, Detroit White Lead Works, Devoe & Raynolds Company, William H. Lucas, Albert Lucas, and Harrison Brothers & Company, complainants, and file the following assignments of error upon which they and each of them will rely upon their appeal from the decree, order and judgment entered by this honorable Court on the fourteenth day of April, 1906, in the above entitled cause:

I.

That said Circuit Court erred in entering said final decree, order and judgment dismissing the bill of complaint for want of equity.

741 II.

That said Court erred in denying the motion of complainants for a preliminary injunction pending the final hearing of said cause.

III.

That said Court erred in not making, rendering and entering a decree in favor of the complainants and against the defendant, finding the statute of the State of North Dakota described in the bill of complaint in said cause to be unconstitutional and void.

IV.

That said Court erred in finding and holding that the statute of the State of North Dakota described in said bill of complaint was constitutional and not in contravention of the Fourteenth Amendment to the Constitution of the United States.

V.

That said Court erred in not granting the relief prayed for by complainants in their bill of complaint and entering a final decree in accordance therewith.

In order that the foregoing assignment of errors may be and appear of record, the complainants present the same to the Court and pray that such disposition may be made thereof as is
742 in accordance with law and the statutes of the United States in such case made and provided, and complainants pray a reversal of the decree, order and judgment made and entered by said Court.

HENRY L. STERN,
SIGMUND ZEISLER,
SPALDING & STAMBAUGH,
Solicitors for Complainants.

Upon the back of said Assignment of Errors appear endorsements in words and figures following, to-wit:
"#500. Circuit Court of the United States, Eighth Circuit District of North Dakota, Southeastern Division. Heath & Milligan Mfg. Co., *et al.*, *vs.* J. H. Worst. Assignment of Errors. Henry L. Stern, Sigmund Zeisler, Spalding & Stambaugh, Solicitors. Filed Apr. 14, 1906, J. A. Montgomery, Clerk."

Thereupon afterwards, to-wit: on the 14th day of April, A. D. 1906, Order allowing Appeal was filed in this cause, which Order is in words and figures following, to-wit:—

743 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

In the Circuit Court of the United States in and for the Eighth Circuit, District of North Dakota, Southeastern Division. In Equity.

HEATH AND MILLIGAN MANUFACTURING COMPANY ET AL.
vs.
J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station.

Upon motion of Henry L. Stern, Sigmund Zeisler and Spalding and Stamburgh, solicitors for complainants, and on filing petition of Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, Bradley & Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead & Color Works, Detroit White Lead Works, Devoe & Raynolds Company, William H. Lucas, Albert Lucas and Harrison Brothers & Company, for an order allowing appeal, together with assignment of errors, it is ordered that an appeal be and hereby is allowed to the Supreme Court of the United States from the final decree, order and judgment entered herein on the 14th day of April, 1906; that the amount of the

bond upon said appeal be and hereby is fixed at the sum of Five Hundred Dollars, and that a certified transcript of the record and proceedings herein be forthwith transmitted to the Supreme Court of the United States.

CHARLES F. AMIDON, *Judge.*

744 Upon the back of said Order Allowing Appeal appear the following endorsements in words and figuures following, to-wit:

"#500. Circuit Court of the United States, Eighth Circuit, District of North Dakota, Southeastern Division. Heath & Milligan mnfg. Co. *et al., vs.* J. H. Worst. Order Allowing Appeal. Filed Apr. 14, 1906. J. A. Montgomery, Clerk."

Thereupon afterwards, to-wit: on the 14th day of April, A. D. 1906, Appeal Bond was filed in this cause, which Appeal Bond is in words and figures following, to-wit:—

745 Know all men by these presents, That we, Heath & Milligan Manufacturing Company, a corporation, The Sherwin-Williams Company, a corporation, Bradley & Vrooman Company, a corporation, Patton Paint Company, a corporation, John W. Masury & Son, a corporation, Acme White Lead & Color Works, a corporation, Detroit White Lead Works, a corporation, Devoe & Raynolds Company, a corporation, William H. Lucas, Albert Lucas, and Harrison Brothers & Company, a corporation, as principals, and American Surety Company of New York, a corporation as surety, are held and firmly bound unto J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station in the full and just sum of Five Hundred Dollars ($500.00) to be paid to the said J. H. Worst, his attorneys, executors, administrators or assigns; to which payment well and truly to be made we bind ourselves, our heirs, executors, administrators and executors jointly and severally by these presents.

Sealed with our seals and dated this fourteenth day of April in the Year of our Lord One Thousand Nine Hundred and Six.

Whereas, lately at a session of the Circuit Court of the United States for the District of North Dakota in a suit pending in said Court between Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, Bradley & Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead & Color Works, Detroit White Lead Works, Devoe & Raynolds Company, William H. Lucas, Albert Lucas, and Harrison Brothers &
746 Company, as complainants, and the said J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, as defendant, a final decree was rendered against the said complainants, and the said complainants having prayed and obtained an appeal to reverse the decree in the aforesaid suit, and a citation directed to the said J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, citing and admonishing him to be and appear at a Supreme Court of the United States to be holden at Washington, within sixty days from the date thereof,

Now the condition of the above obligation is such, That if the said complainants shall prosecute their said appeal to effect and shall answer all damages and costs if they fail to make their plea good, then the above obligation to be void; else to remain in full force and virtue.

HEATH & MILLIGAN MANUFACTURING COMPANY, [SEAL.]
THE SHERWIN-WILLIAMS COMPANY, [SEAL.]
BRADLEY & VROOMAN COMPANY, [SEAL.]
PATTON PAINT COMPANY, [SEAL.]
JOHN MASURY & SON, [SEAL.]
ACME WHITE LEAD COMPANY, [SEAL.]
DETROIT WHITE LEAD WORKS, [SEAL.]
DEVOE & RAYNOLDS, [SEAL.]
WILLIAM H. LUCAS, [SEAL.]
ALBERT LUCAS, [SEAL.]
HARRISON BROTHERS & COMPANY, [SEAL.]
By HENRY L. STERN, [SEAL.]
Their Attorney-in-fact.
AMERICAN SURETY COMPANY OF NEW YORK,
By DANIEL T. HUNT, *Res. Vice Pres't.*

Approved:
CHARLES F. AMIDON, *Judge.*
Attest:
[SEAL.] FREDERIC F. NORCROSS,
Res. Ass't Sec'y.

747 Upon the back of said Appeal Bond appear endorsements in words and figures following, to-wit:—

"#500. Circuit Court of the United States, Eighth Circuit, District of North Dakota, Southeastern Division. Heath & Milligan Mfg Co., *et al., vs.* J. H. Worst. Appeal Bond. Henry L. Stern, Sigmund Zeisler, Spalding & Stambaugh, Solicitors. Filed, Apr. 14, 1906, J. A. Montgomery. Clerk."

Thereupon afterwards, to-wit: on the 14th day of April, A. D. 1906, Citation was issued in this cause, of which the following is the original:—

748 UNITED STATES OF AMERICA, *ss:*

To J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station, Greeting:

You are hereby cited and admonished to be and appear at the Supreme Court of the United States, at Washington, within sixty days from the date hereof, pursuant to an appeal filed in the Clerk's office of the Circuit Court of the United States for the District of North Dakota, South Eastern Division, wherein Heath and Milligan Manufacturing Company, the Sherwin-Williams Company, Bradley Vrooman Company, Patton Paint Company, John W. Masury & Son, Acme White Lead and Color Works, Detroit White Lead

Works, Devoe & Raynolds Company, Wiliam H. Lucas, Albert Lucas and Harrison Brothers and Company are Appellants and you are Respondent, to show cause, if any there be, why the decree rendered against the said appellants as in said appeal mentioned should not be corrected and why speedy justice should not be done to the said parties in that behalf.

Witness the Honorable Melville W. Fuller, Chief Justice of the Supreme Court of the United States of America, this 14th day of April, A. D. 1906, and of the Independence of the United States the one hundred and thirtieth.

CHARLES F. AMIDON,
United States District Judge Presiding in the Circuit Court.

Attest:
J. A. MONTGOMERY, *Clerk,*
By E. V. EGGERT, *Deputy.*

749 Service of the within Citation is hereby admitted at the City of Fargo, in the County of Cass and State of North Dakota, on this 16th day of April, 1906, by receipt of a true copy thereof.

BALL, WATSON & MACLAY,
Solicitors for Respondent.

749½ [Endorsed:] 500 United States District Court, District of North Dakota, South Eastern Division. Heath & Milligan Mfg. Co. *et al.*, Appellants, against J. H. Worst, Respondent. Citation. Filed Apr. 14 1906 J. A. Montgomery, Clerk. Henry L. Stern, Sigmund Zeisler Newman, Spalding & Stambaugh, Solicitors for Appellants, Fargo, North Dakota.

750 UNITED STATES OF AMERICA, *District of North Dakota, ss:*

I, J. A. Montgomery, Clerk of the United States Circuit Court, for the District of North Dakota, do hereby certify that the foregoing pages, from 1 to 749 contain true and faithful transcripts of all pleadings, process and proceedings of record and on file in my office as said clerk and the whole thereof, and the indorsements thereon, in the case of Heath and Milligan Manufacturing Company, *et al. vs.* J. H. Worst, Director of the North Dakota Government Agricultural Experiment Station.

Witness my hand and the seal of the Circuit Court aforesaid this 8th day of May, A. D. 1906.

[Seal Circuit Court of the United States, District of North Dakota.]

J. A. MONTGOMERY, *Clerk.*

Endorsed on cover: File No. 20,268. North Dakota C. C. U. S. Term No. 304. Heath & Milligan Manufacturing Company, The Sherwin-Williams Company, *et al.*, appellants, *vs.* J. H. Worst, director of the North Dakota Government Agricultural Experiment Station. Filed May 25th, 1906. File No. 20,268.

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IN THE

Supreme Court of the United States

OCTOBER TERM, A. D. 1907.

HEATH & MILLIGAN MFG. CO. et al.

vs.

J. H. WORST, Director of the N. D. Gov't. Agricultural Experiment Station.

BRIEF AND ARGUMENT FOR APPELLANTS.

PART I.

STATEMENT OF THE CASE.

A. Character and History of the Proceedings.

This is an appeal from the Circuit Court of the United States for the District of North Dakota, to review a final decree dismissing a bill to restrain the director of the North Dakota Government Agricultural Experiment Station from enforcing the provisions of the statute of North Dakota entitled, "An Act to prevent the adulteration of and deception in the sale of white lead and mixed paints," approved March 6, 1905, in force January 1, 1906, upon the ground that it is repugnant to the last two clauses

of the first section of the Fourteenth Amendment to the Constitution of the United States.

The bill was brought by eleven paint manufacturing concerns, ten of which are corporations organized in various states of the Union other than North Dakota, and one of which is a copartnership consisting of two individual citizens of Pennsylvania.

The defendant to the bill was one J. H. Worst, in his capacity as director of the North Dakota Government Agricultural Experiment Station, who by the statute in question is "charged with the proper enforcement of all the provisions" thereof.

The bill was filed on January 2, 1906, the first day on which it could be filed after the statute went into force. On the same day a temporary restraining order as prayed for in the bill of complaint was entered and served upon the defendant.

On January 5th and 6th, 1906, the motion of complainants for a preliminary injunction was heard on the verified bill of compiaint, and the affidavit of one E. F. Ladd, the chemist of said experiment station, in opposition to said motion. After arguments the court ordered that the subject-matter embraced in certain allegations of Paragraph 17 of the bill of complaint be referred to a special master to take evidence thereon and report the same to the court; the court further ordered that the motion for a preliminary injunction be continued for disposition until after the taking of such evidence and that until such disposition the temporary restraining order previously made remain in full force.

Pursuant to this order of reference a large amount

of testimony was taken and reported to the court. Thereupon, on February 23rd and 24th, 1906, the motion for a preliminary injunction was again heard with the result that the motion was denied and the restraining order previously issued was vacated.

On March 2, 1906, the defendant filed an answer to Paragraph 17 of the bill of complaint and a demurrer to all other paragraphs thereof.

Pursuant to a stipulation between the solicitors for the parties the case was submitted for final hearing and decree upon the bill of complaint, the answer of the defendant to Paragraph 17 of the bill, the replication of complainants to said answer, and the demurrer of the defendant to the remainder of the bill, and upon said affidavit of E. F. Ladd and upon the evidence taken in pursuance of the special order of reference, with the result that on April 14, 1906, a final decree was entered dismissing the bill for want of equity.

The bill of complaint, by allegations and upon grounds to be noted more fully hereafter, raised the question of the repugnance of the statute above mentioned to those clauses of the Fourteenth Amendment of the Federal Constitution which provide that no state shall deprive any person of property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws. Among the errors assigned on this appeal are two which question the finding and holding by the court below that the statute in question was constitutional and not in contravention of the Fourteenth Amendment

to the Federal Constitution. Hence the direct appeal from the Circuit Court to this court.

The issues of fact are limited to the allegations of paragraph 17 of the bill and the answer of the defendant thereto which is partly in the nature of a denial and partly in the nature of a confession and avoidance.

All the allegations of the bill other than those of paragraph 17 are, of course, admitted by the demurrer to be true.

B. The Statute in Question.

The statute whose constitutionality was thus drawn in question, reads as follows:

"An Act to prevent the adulteration of and deception in the sale of white lead and mixed paints.

Be it enacted by the Legislative Assembly of the State of North Dakota:

1. Every person, firm or corporation who manufactures for sale or exposes for sale, or sells, within this state, any white lead, paint or compound intended for use as such, shall label the same in clear and distinct open gothic letters upon a white background and show the true per cent. of each mineral constituent contained in said paint, or if other than linseed oil is used in its preparation, the names of such oils or substitutes shall be shown together with the percentage thereof, and every person, firm or corporation who manufactures for sale, or exposes for sale or sells within this state any mixed paint or compound intended for use as such which contains any ingredient other than pure linseed oil, pure car-

bonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors, shall be deemed guilty of a misdemeanor and upon conviction thereof shall, for each offense, be punished by a fine of not less than twenty-five and not more than one hundred dollars and costs, or by imprisonment in the county jail not exceeding sixty days; provided that any such person, firm or corporation, who shall manufacture for sale or expose for sale, or sell within this state any white lead, paint or mixed paint containing ingredients other than those as above enumerated, shall not be deemed guilty of a violation of this act in case the same be properly labeled showing the quantity or amount of each and every ingredient used therein and not specified above, and the name and residence of the manufacturer or person for whom it is manufactured.

2. The having in possession by any person, firm or corporation dealing in said articles, any articles or substances hereinbefore described and not properly labeled, as provided by Section 1 of this act, shall be considered *prima fa ie* evidence that the same is kept by such person or firm in violation of the provisions of this act and punishable under it.

3. The director of the North Dakota Government Agricultural Experiment Station is charged with the proper enforcement of all the provisions of this act.

4. The said director and the assistants, experts, chemists and agents shall be duly authorized for the purpose, and shall have access and ingress to all places of business, factories, stores and buildings used for the manufacture or sale of paints. They

shall also have power and authority to open any package, can, jar, tub or other receptacle containing white lead paints that may be sold, manufactured or exposed for sale, in violation of the provisions of this act.

5. This act shall take effect and be in force from and after January 1, 1906."

C. The Scope and Purpose of the Statute and the Meaning of its Technical Terms.

1.—Introductory.

Paint is an artificial compound consisting of finely divided solid matter mixed with and held together by oily liquids. The solid substances fit for use in paint are called "pigments." The liquids are technically known as "vehicles" or "thinners" or "thinning material."

The manufacturing process by which the finely divided particles of the dry pigments are blended together through the admixture of oil is called "grinding in oil."

The paint produced by this grinding process is of a paste consistency. In this shape it is too thick, too dense to be spread upon a surface. To give it the consistency necessary for spreading, it must be mixed with additional thinning material.

Formerly *all* paint manufactured and sold was of paste consistency, and the painter, before spreading it, added the required additional vehicle. About twenty-five years ago American paint manufacturers began to put up and sell paint so thinned down by the admixture of the necessary amount of liquids as

to make it ready for use. Paint in this form has found a gradually increasing demand. However, the manufacture and sale of paint of paste consistency is still a substantial part of the business. The two forms of paint referred to are technically known as "paste paint" and "mixed paint," respectively.

This statute deals with (1) white lead and substitutes therefor; and (2), mixed paint.

"White lead" is a paste paint of special composition.

Paste paint other than white lead covers a multitude of paints in paste form, all of which are not covered by the act.

2.—Meaning of Technical Terms.

It is quite apparent—and we believe it will not be contested—that the comma between the words "white lead" and "paint" in the third line of Section 1 was placed there through an error and that the words "white lead paint" must be read together as one term. This is shown by the title of the Act. It is further shown by the use of the term "white lead paint" in the last sentence of Section 4 of the Act. Moreover, if the word "paint" following the words "white lead" in the place above indicated were to be given meaning as a separate term, it would be broad enough to include "mixed paint" which is separately and differently treated further on, thus leading to irreconcilable contradictions in the provisions. Again, in that case, the words immediately following, "or compound intended for use as such," would lose all meaning. White lead paint

being a paint of definite description, there may be and there are compounds intended as substitutes therefor. But "paint" being a compound of no definite description, the idea of a "compound intended for use as such" is nonsense.

The term "white lead" as used in the title, and the term "white lead paint" as used in the body of the Act are intended to denote *commercial carbonate of lead* ground in linseed oil to a *paste* consistency. (Paragraph 16 of Bill, Trans., 10-11.)

The term "compound intended for use as such" following the words "white lead paint" in the third line of the first section of the Act are intended to denote a paint of paste consistency intended as a substitute for white lead and labelled or sold as white lead, but which does not contain any carbonate of lead or which contains other pigment than carbonate of lead in addition thereto. Various such substitutes are frequently sold in the market labelled as white lead. (Paragraph 16 of Bill, Trans., 11.)

The term "mixed paint" has an absolutely defined meaning in the paint manufacturing and selling trade and means a paint which, before being put up by the manufacturer in cans or other containers, has been thinned by the admixture of a sufficient amount of liquid vehicles so as to reduce it to a consistency which makes it ready for use, *i. e.*, spreading. The term "mixed paint" is used in contradistinction to what is known as "paste paint." The term "paste paint" likewise has an absolutely defined meaning in the paint manufacturing and selling trade and means a compound in paste form containing the necessary elements to make it a paint ready for use,

except that it requires the addition of thinning material to give it the consistency necessary to make it ready for application to the surface intended to be covered. (Paragraph 15 of Bill, Trans., 10.)

In other words, the only difference between mixed paint and paste paint is this: mixed paint is paint which has the required amount of thinning material to make it ready for application; while paste paint is paint which contains only sufficient thinning material to give it paste consistency and requires the addition of thinning materials to make it ready for application to a surface.

White lead paint, as the term is used in the Act, is a white paste paint. There are, however, as many kinds of paste paint as there are shades and colors of paint. White lead paint is only one species of paste paint.

As to mixed paint, the Act specifies the following allowable ingredients: pure linseed oil, pure carbonate of lead, oxide of zinc, turpentine, japan dryer and pure colors.

Of the specified ingredients two, namely, carbonate of lead and oxide of zinc, are known as white pigments, or the solid matter intended to give the paint its body (*i. e.*, opacity) and density (*i. e.*, solidity) and serve as a protective coat for the surface to be covered.

The term "pure colors" is intended to denote colored pigments used to produce shades and colors of paint other than white.

Linseed oil and turpentine are liquid vehicles used to combine the finely divided particles of the dry

pigments and to give the paint the proper consistency to make it ready for use.

Japan dryer is a liquid compound intended to promote the oxidation or drying of the paint after it is spread on a surface.

3.—The Scope of the Act.

As regards white lead paint and substitutes therefor the statute requires a label thereon which shall show the true per cent. of *each mineral constituent* therein; and if other than linseed oil is used in its preparation, the label must show the names of such oils or substitutes together with the percentage thereof. It may be stated in passing that we have no fault to find with this provision.

The Act makes no mention of paste paint other than white lead. *Such paste paint, no matter what its ingredients, need not be labelled.* "The manufacture and sale of paste paint is a substantial part of the paint manufacturing and selling business of the United States." (Paragraph 33 of bill, Trans., 18, *admitted* by the demurrer.)

For the better understanding of the meaning of the provision regarding mixed paint it should be remarked that in addition to the two white pigments specified in the statute (hereinafter referred to as "statutory pigments") there are numerous other white pigments which are commonly used in modern paint making. As to these we claim and the proof establishes that some of them (hereinafter referred to as "Class A pigments") are *equally as useful, efficient and un-*

objectionable as the statutory white pigments and that others (hereinafter referred to as "Class B pigments") are in all cases useful to a certain considerable extent as furnishing to the paint valuable qualities not possessed by the statutory pigments and in other cases (in certain shades of paint) are *absolutely indispensable.*

It should also be remarked that varnish, a liquid not specified in the statute, is highly valuable for a large class of mixed paints intended for certain uses; varnish possessing useful qualities as an ingredient of such mixed paints not possessed by any of the liquids specified in the statute. This fact is admitted.

As to mixed paint the statute makes the following classification:

1. Mixed paint which contains any ingredient other than those specified; and,

2. Mixed paint which does not contain any ingredient other than those specified.

The manufacture or sale of the first class constitutes a misdemeanor punishable by fine or imprisonment, unless the paint is labelled showing the quantity or amount of each and every ingredient used therein and not specified in the Act.

The manufacture or sale of the second class is free from these consequences or conditions.

4.—The Purpose of the Act.

The only discoverable purpose of the statute is to protect the people of North Dakota from having imposed upon them inferior brands of paint. If the statute can be brought under any of the legitimate

purposes of the exercise of the police power, it would be the prevention of fraud. That the statute cannot have been intended, and has no tendency, to promote the interests of health appears from a specific allegation of the bill which is *admitted* by the demurrer. (Paragraph 29 of Bill, Trans. 17.)

D. The Statutory Standard of Mixed Paint is Unreasonable, Because it is Vague, Uncertain and Too Inclusive.

The specification of the six allowable ingredients mentioned in the Act, is apparently an attempt to fix by law a standard of good or proper or "pure" mixed paint.

Let it be admitted, for the sake of the argument, that good mixed paint *can* be made *for certain limited purposes* by using *all* the specified ingredients *in proper proportions* (keeping always in mind, of course, that "colors" are not necessary in white paint). The evidence, however, absolutely establishes that, given the limit of the ingredients specified in the statute, good mixed paint cannot be made except by using *all* the specified ingredients *in certain proportions*. If carbonate of lead is used as the sole white pigment or if oxide of zinc is used as the sole white pigment, the result necessarily is poor paint. If both are used, the best result, generally speaking, is produced by a combination of the two statutory pigments in equal parts. Substantial variations from this formula in either direction give bad results. The proportion of solids to liquids should generally be as 60 to 40. Substantial variations from this proportion give bad results. Tur-

pentine should make up a small part and linseed oil should make up the bulk of the vehicle. A comparatively small amount of japan dryer is all that serves a useful purpose.

But the standard set up by the statute is purely *negative.* The standard *excludes* all materials except those specified. It *merely allows* the specified materials. It *does not require* that *all* the specified ingredients be used in a mixed paint to bring it up to the standard. And it *does not provide a maximum or minimum* for the percentage which any of the specified ingredients shall constitute.

The standard, therefore, includes a mixed paint made out of carbonate of lead and linseed oil and nothing else; or made out of carbonate of lead and turpentine and nothing else; or made out of carbonate of lead and japan dryer and nothing else; or made out of oxide of zinc and linseed oil and nothing else; or made out of oxide of zinc and turpentine and nothing else; or made out of oxide of zinc and japan dryer and nothing else; or made out of one per cent. of carbonate of lead, thirty-nine per cent. of oxide of zinc, twenty per cent. of linseed oil, twenty per cent. of turpentine and twenty per cent. of japan dryer; or it might be made out of two per cent. of carbonate of lead, forty-eight per cent. of oxide of zinc, and fifty per cent. of japan dryer.

Each of these mixed paint combinations and innumerable others which might be mentioned would come within the standard set up and thus escape the penal provisions and the requirements of labelling, because none of them contains any ingredient other than those specified in the Act.

But each of these, the evidence absolutely establishes, would be a miserable concoction measured by the efficiency and durability of ordinary good paint.

Moreover, in specifying *pure* carbonate of lead instead of *commercial* carbonate of lead the Legislature of North Dakota has ignorantly specified an article which is totally unfit to be used as an ingredient of paint. The bill in this regard alleges (Paragraph 22 of Bill, Trans. 14) and the demurrer admits that pure carbonate of lead "is an article which cannot be used for the purpose of manufacturing paint; that the carbonate of lead which is commonly used and has been used from time immemorial in the manufacture of paint, even of the very highest grades, is not pure carbonate of lead, but contains approximately twenty to thirty per cent. of other ingredients."

Inasmuch as "pure carbonate of lead" cannot be used, it might as well be stricken from the statute. This would leave only one allowable white pigment, oxide of zinc, which all the witnesses agree cannot make good paint if used as the sole white pigment. We will, however, in the further course of this brief, treat the term "pure carbonate of lead" as though it read or meant "commercial carbonate of lead." Even then it is clear from the preceding consideration that the attempt of the Legislature to set up a standard of good paint is a failure by reason of its uncertainty and inclusiveness in that it omits to require that *all* the specified ingredients be used and to fix maximum and minimum per centages.

E. The Statutory Standard of Mixed Paint is Unreasonable, Because of its Arbitrary and Unjust Exclusiveness.

The standard set up is arbitrary, unjust and unreasonable in excluding from the list of allowable ingredients and in branding as adulterants a number of materials which constitute proper, efficient and useful and, in some instances and for certain purposes, indispensable ingredients of mixed paint.

1.—The Only Permissible Standard for Paint Is a Standard of Efficiency, Not a Standard of Purity.

The bill alleges (Paragraph 27 of Bill, Trans. 16) and the demurrer admits "that the only purposes for which paint is used are to preserve and beautify; that is to say, to protect the painted material from the destructive effect of exposure to atmospheric conditions and the action of the elements, and to make the surface more pleasing to the eye; that that paint is the most efficient which accomplishes these purposes in the highest degree for the longest time; that any ingredient which tends to enhance the efficiency of paint or give it a useful quality is a proper ingredient; that there is no natural standard of purity of paint, nor is there a generally or even widely accepted standard of purity of paint; that any enumeration of allowable ingredients of paints short of an exhaustive enumeration of all ingredients which may under particular circumstances or conditions give to paint a useful quality, is necessarily unjust and unreasonable; that even such an

exhaustive enumeration in the light of the knowledge of the technology of paint manufacturing of today is liable to become unjust and unreasonable by to-morrow's discoveries."

2.—The Modern Technology of Paint Manufacture Is the Result of an Evolutionary Process and of Scientific and Practical Investigation.

The answer of the defendant closely following certain allegations of paragraph 17 of the bill, says (Trans., 421, 422): "I admit the manufacture of paint, and more particularly of mixed paint, involves many practical problems, the proper solution of which demands the application of a variety of scientific principles, and is the result of a variety of practical tests and experiments, and that the means, methods and processes employed in such manufacture have changed materially in the course of years to conform to the discovery of new scientific facts and the results of practical experiments. I admit that the technology of paint manufacture has made a gradual and constant progress during the past fifty years, during which time it has undergone an evolutionary process, but I do not know and cannot set forth whether such process is still far from completed. I admit that formerly carbonate of lead was the only material which was universally accepted as the proper pigment to be used in paints requiring or admitting of the use of a white pigment; and I admit that oxide of zinc has gained general recognition as being in many cases appropriate as a like pigment, and that it has come to be uni-

versally conceded as possessing important useful qualities as a white pigment not possessed by carbonate of lead, but I * * * aver that it has been thus generally recognized and used for a period of about thirty years prior to this time."

The bill alleges (Paragraph 19 of Bill; Trans., 12, 13) and the demurrer admits "that most of the successful paint manufacturers in the United States have for many years maintained and continue to maintain, in connection with their factories, chemical laboratories wherein are employed most accomplished chemical experts who constantly conduct investigations, researches and experiments with a view to discovering improved methods of manufacturing paint, the qualities and properties of new materials which might be usefully employd in the manufacture of paint, the proper combination between various ingredients of paint and the proportionate amount of such ingredients which will produce the best results; and said manufacturers also have for years maintained and continue to maintain, in connection with their respective factories, stations for the conducting of purely physical tests to determine the covering power, opacity, durability, spreading quality, consistency, density and other physical properties of various kinds of paints manufactured by them, respectively, and by rival manufacturers, as applied to varying conditions both as regards the physical qualities of the surface to be covered and as regards the atmospheric and weather conditions generally to which paint-covered surfaces are exposed in many of which tests painted surfaces are exposed to atmospheric influences approaching as

nearly as possible the conditions existing in various climates and at various seasons; that the business success of the various paint manufacturers largely depends upon the efficiency of said laboratories and experimental stations and their readiness and ability to conform their methods of manufacturing to the truths discovered by said investigations and tests; that said investigations and experiments and the careful consideration by the manufacturers of paint of the actual results attending the use of their products under varying climatic conditions have led to the adoption of constantly improved methods of manufacture, including the use of a widening range of ingredients, as hereinabove shown, and have brought about a constantly increasing degree of efficiency in the paint produced."

3.—The Widened Range of Properly Usable White Pigments.

The bill alleges (Sub-paragraphs a and b of Paragraph 17, Trans., 11, 12), and the evidence taken under the special order of reference abundantly establishes that, through practical experiments and tests made within the last fifteen years with a view to widening the range of white pigments properly usable in the manufacture of paint, it has been demonstrated and is now conceded by the most advanced and most successful paint manufacturers in the world:

a. "That there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection therewith and in other cases may be used instead thereof, and which,

either without carbonate of lead or oxide of zinc, or in connection with one or both of these, according to circumstances, are as efficient as, and in some respects more efficient than, carbonate of lead or oxide of zinc or a combination of the two for the purposes for which the latter are used in paint; that among said materials are (a) sublimed lead (which is an artificial product consisting of sulphate of lead and oxy-sulphate of lead), (*b*) standard zinc lead white (which is commonly called zinc lead and is an artificial product made by the United States Smelting Company and sold in large quantities and consists of a combination of sulphate of lead and oxide of zinc united by a furnace process), (*c*) zinc made from western ores which carries in its natural composition varying proportions of sulphate of lead and oxide of zinc and (*d*) an artificial opaque white pigment consisting essentially of zinc sulphide, zinc oxide and barium sulphate which is known to the paint manufacturing trade under various trade names such as lithopone, ponolith, lithophone, charlton white, becton white and Orr's white.

b. That there are certain white pigments other than carbonate of lead and oxide of zinc which constitute proper and useful ingredients of paints and which, if so used in connection with carbonate of lead or oxide of zinc or a combination of the same, or in connection with one or more of said other materials described in the last preceding paragraph as proper substitutes for carbonate of lead and oxide of zinc furnish to the paint wherein used important useful qualities not possessed by either carbonate of lead or oxide of zinc or any of said substitutes therefor;

that among said other pigments are sulphate of barium, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, and others; that the proportionate amount of the pigments last named which may properly and usefully be made an ingredient of paint and whether any of them may be properly used as such ingredient depends upon a great variety of conditions and circumstances, but all of said pigments may, under proper conditions, serve a highly useful purpose and where properly used do essentially increase the durability and density of the paint."

The two white pigments specified in the statute, carbonate of lead and oxide of zinc, were in the evidence referred to as "statutory pigments." The pigments mentioned in Sub-paragraph a of Paragraph 17 of the Bill, sublimed lead, zinc lead white, zinc from western ores, and lithophone, were grouped and referred to in the evidence as "Class A pigments." Those mentioned in Sub-paragraph b of Paragraph 17 of the Bill, sulphate of barium (also known as barytes), silica, silicate of magnesia, calcium carbonate and hydrated sulphate of lime (also known as gypsum) were grouped and referred to in the evidence as "Class B pigments." For the sake of convenience we will, in the further progress of this brief, use the same terminology for the three classes of pigments.

It should be observed, for a better understanding of the relation of these classes to each other, that the Class A pigments have two important characteristics in common with the statutory pigments. The statutory pigments have coloring (color modifying)

strength and opacity (hiding power). So have the Class A pigments. But the Class A pigments have in addition greater durability of substance. Wher ever and to the same extent that either of the statutory pigments is properly usable, one or another or a combination of Class A pigments can be used to at least as good advantage. And certainly it is impossible to make as good paint by the use of the statutory pigments alone as can be made by using them in combination with one or more of the Class A pigments.

The Class B pigments on the other hand, though likewise white, lack coloring strength and are deficient in opacity. Thus they can serve but indifferently the *beautifying* purpose of paint. They are, however, capable of furnishing a *protective* coat for the surface to be painted, and by reason of their practical indestructibility can serve the *protecting* purpose of paint much better than the statutory pigments, both of which are easily decomposable chemical bodies.

Moreover, in a great number of shades of paint (certain reds, blues, greens, browns, etc.), constituting not less than 25 per cent. of the aggregate of all mixed paints used in North Dakota, neither the statutory nor the Class A pigments can possibly be used to give to the paint the necessary density and protective quality by reason of the very coloring strength possessed by these pigments, which would modify the shades sought to be produced. In the case of the shades referred to these purposes can only be served by the use of Class B pigments. In other words, Class B pigments are in these cases

absolutely indispensable. Their lack of opacity is no objection there, because in the cases of these shades the coloring matter necessarily used to produce the shade furnishes all the required opacity. Nor is it possible in these shades to dispense with white pigments altogether, because a combination of the coloring matter alone with the liquids would produce merely a stain and not a paint of protective quality.

There are also numerous other shades, lighter than those just referred to, wherein the statutory pigments are not entirely *excluded*, but in which their use is more or less *limited* by reason of their color-modifying strength. In these cases the balance of the necessary white pigment basis can be supplied by nothing else than Class B pigments.

But even in the case of white paint and of those lighter shades of paint wherein the color modifying strength of the statutory pigments does not limit or forbid their use and where, therefore, Class B pigments are not indispensable, the latter, if not used in excess of one-third of the total amount of white pigments, greatly increase the durability or, as it is called, the "life of the paint," without detracting from the desirable degree of opacity or impairing any other useful quality of the paint. The statutory pigments are easily decomposable bodies; the Class B pigments, with one possible exception, are stable and almost indestructible. The *protective* purpose of paint is therefore much better served by Class B pigments than by either of the statutory pigments or a combination thereof. It is the *beautifying* purpose of paint which the Class B pigments

cannot serve so well because they are deficient in hiding power, being more or less translucent. The *protective* purpose of paint is, however, to say the least, of equal importance with its beautifying purpose. Experience has absolutely demonstrated that a combination between the statutory pigments and one or more of the Class B pigments, in which Class B pigments are used not in excess of one-third of the total amount of white pigments, is vastly more durable and efficient than either of the statutory pigments or any combination thereof without the addition of another white pigment.

There are other important, useful qualities of the Class B pigments as ingredients of mixed paint, which will be mentioned hereinbelow in the proper place.

4.—The Ground Upon Which the Exclusion of Class A Pigments Is Defended.

Answering the allegations of Sub-paragraph a of Paragraph 17 of the Bill, the defendant says (Trans. 422, 423; Rec., 729, 730):

"I admit that as the results of tests and experiments it has been demonstrated that there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection with, and in other cases may be used instead thereof; but I deny that such materials either without carbonate of lead or oxide of zinc, or in combination with one or both of these, are as efficient as, or in any respects more efficient than, carbonate of lead or oxide of zinc, or a combination of the two for the purposes for which the latter are used in

paint, and on the contrary I allege *that sufficient tests and examinations have not yet been made, and sufficient time has not yet elapsed since their production as articles of commerce, to determine or demonstrate the value and usefulness of sublimed white lear or of zinc lead white or of lithophone* (so called in the bill); and I allege that thus far the use and value of each of said last named materials for the purpose aforesaid have not progressed beyond the experimental stage; I aver that there are about one hundred leading paint manufacturers in the United States each of whom prepare and market annually one hundred thousand gallons, or more, of mixed paints, *and I allege upon information and belief that about one-half of such leading paint manufacturers are not convinced of the usefulness, value or efficiency of sublimed white lead, zinc lead white, or lithophone,* for the purposes aforesaid, *and that they entirely reject them as pigments in the preparation of mixed paints;* that some of said manufacturers so reject them because as the results of tests made by them or under their supervision, such materials have proved to be unsatisfactory and inefficient as pigments in the preparation of mixed paints; and other of said manufacturers exclude them and refuse to employ them for the purposes aforesaid, for the reason that a sufficient time has not yet elapsed since such materials appeared upon the market as articles of commerce, within which to properly test, determine and demonstrate their value as ingredients of mixed paints. I admit that zinc made from western ores is a useful, valuable and efficient ma terial as a pigment in the preparation of mixed paints provided sulphate of lead incidental to its

production, does not exceed in quantity five per cent. of its constituent elements; and I allege that the presence of more than five per cent. of the sulphate of lead in the zinc injures and lessens its efficiency and value for the purposes aforesaid; I allege that the proportions or percentages of sulphate of lead present in zinc made from western ores, is widely variant, and lacks uniformity, and that the presence of more than five per cent. of sulphate of lead destroys its commercial purity as oxide of zinc."

So far as the allegations to which this part of the answer applies are put in issue thereby, they are abundantly established by the evidence taken under the special order of reference, as will hereinbelow be demonstrated.

The statement of the answer that about one-half of the one hundred leading paint manufacturers in the United States are not convinced of the usefulness, value or efficiency of sublimed lead, zinc lead white and lithophone, and reject them as pigments in the preparation of mixed paint is disproved by the evidence which tends to show that with few exceptions all manufacturers use them. The statement, however, must be construed most strongly against the pleader and thus becomes an admission that the other one-half have become convinced of their usefulness, value and efficiency and use them as pigments in the preparation of mixed paints. Of those manufacturers who are alleged to reject them the answer asserts that some (one or two or three would be "some") so reject them because as the results of tests made by them (which may have been

made under improper conditions) they proved unsatisfactory, and that other of said manufacturers rejecting them (who might be 47 or 48 of the 50 manufacturers alleged to reject them) exclude them simply because they have not found out their value, usefulness and efficiency. In other words, the conservatism or intellectual laziness or lack of progressiveness of some manufacturers which kept them from finding out that sublimed lead, zinc lead white and lithophone are valuable, useful and efficient white pigments (a fact of which one-half of the leading manufacturers have become convinced as the result of tests and experiments) are relied upon as a justification for the provisions of the statute which brands these pigments as adulterants.

As to zinc made from western ores, a passage of the answer above quoted admits that it is a useful, valuable and efficient pigment provided it contains no more than five per cent. of sulphate of lead. This is an admission that the statute should have specified among the allowable ingredients "zinc from western ores containing no more than five per cent. of sulphate of lead." The statute, however, brands it as an adulterant even if it contains no more than five per cent. of sulphate of lead; brands it as an adulterant even if it contains no more than one per cent. or two per cent. of sulphate of lead. The answer alleges that the presence of more than five per cent. of sulphate of lead in zinc from western ores injures and lessens its efficiency and value as a paint pigment. The evidence, however, abundantly disproves this assertion.

5.—The Ground Upon Which the Exclusion of Class B Pigments Is Defended.

Answering the allegations of Sub-paragraph b of Paragraph 17 of the Bill, the defendant says (Trans. 423):

"In answer to the averments of Sub-paragraph *b* of Paragraph 17 of the Bill, I admit that in the preparation of mixed paints possessing certain colors, to wit: vermilion, certain shades of blue, myrtle green, crylight green, golden olive, brown, crimson and tuscan red, it is necessary to employ some of the articles mentioned in said paragraph *b*, in connection or in combination with some pigment other than carbonate of lead, and that the coloring power of carbonate of lead, if in such cases employed as a pigment, would modify and change the exact shades sought to be produced; but I allege upon information and belief that the aggregate of all mixed paints produced sold and consumed in North Dakota in the preparation whereof it is necessary to exclude carbonate of lead, and to include one or more of the substituted materials mentioned in said paragraphs "*a*" and "*b*," does not exceed about twenty-five per cent. of the aggregate of all mixed paints which may be prepared and produced by the use alone as pigments of carbonate of lead and oxide of zinc. Save as thus admitted, I deny that there are certain white pigments other than carbonate of lead and oxide of zinc, to wit, sulphate of barium, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, or others, which constitute proper or useful ingredients of paint, or that said materials if so used in combination with carbonate of lead or

oxide of zinc, or a combination of the same, or in connection with the substituted pigments described in said sub-paragraph "*a*," whether as substitutes for carbonate of lead, or otherwise, furnish to the paint wherein used important, or any, useful qualities not possessed by either carbonate of lead or oxide of zinc. And save as above admitted, I deny the efficiency or value as ingredients in the preparation of mixed paints, of any of the materials mentioned in said sub-paragraph "*b*," and deny that under any conditions they, or any of them, serve a useful purpose, or under proper, or any, use, increase the durability or density of the paint."

This answer goes very far towards admitting the truth of the allegations of the bill in regard to Class B pigments. In so far as these allegations are controverted by the answer as quoted, they are established beyond a reasonable doubt by the evidence taken under the special order of reference. The answer of the defendant, however, by way of avoidance and with a view to justifying the discrimination of the statute against the Class B pigments, further says (Trans. 423, 424; Rec. 731):

"Further answering Paragraph 17 of the Bill, I aver the fact to be that in the manufacture of mixed paints in the United States at this time, the chief use of the materials mentioned in said sub-paragraph "*b*" of the bill is to cheapen and adulterate the paints wherein they are employed; that of all known substances and materials they are in their nature the best adapted, and lend themselves most readily to the adulteration of, and are most commonly used as adulterants and cheapening ingredients

in the preparation of mixed paints. I further aver that about 70 to 75 per cent. of all the paints used in this State are mixed paints, as defined in the bill, and that the cheapening and adulteration of said mixed paints has become and is a great evil. That many manufacturers in the preparation of their mixed paints use as ingredients great quantities of the materials, or some or more of them, described in sub-paragraph "*b*," all of which are very cheap, and none of which are commercially worth more than one-half to one cent per pound, and so use them in lieu of and as substitutes for carbonate of lead and oxide of zinc, which are worth four and a half to seven cents per pound, and in many cases label their products as pure white lead, or pure white lead in oil or pure mixed paints made of lead and oil. By reason thereof frauds and deceptions are perpetrated upon the public. That no other substances have been discovered or known, which by their inherent qualities lend themselves so readily to, or are so commonly employed for, such purposes of fraud and deception as those described in said sub-paragraph '*b*.'"

The assertion that the chief use of the Class B pigments is to cheapen and adulterate the paints wherein they are employed is disproved by the evidence, which shows that their chief, if not their sole use, is as useful and efficient and, in many cases, indispensable ingredients.

We admit that many manufacturers in the preparation of their mixed paint use great quantities of the Class B pigments in lieu of the statutory pigments, but the evidence shows that such use is for

the purpose of making the paint more efficient and particularly more durable. The allegation, or rather insinuation, that *many* manufacturers use Class B pigments as cheapening ingredients or adulterants is rather vague. Two or three might in the opinion of the defendant be *many*. As this allegation must be construed most strongly against the pleader, it must be accepted as an admission that all but two or three of the manufacturers use the Class B pigments only to the extent to which they furnish useful qualities to paint.

The assertion that any mixed paint sold in North Dakota and containing Class B pigments was ever labelled "Pure mixed paint made of lead and oil" or "Pure White Lead" or "Pure White Lead in Oil" *is not supported by any proof.*

We admit, however, that all of the Class B pigments are considerably lower priced than the statutory pigments. For this reason alone, and not by reason of their possessing any other peculiar quality, do they lend themselves to use as cheapening ingredients, if a manufacturer is disposed to cheapen his product.

Carbonate of lead being the highest priced white pigment, it goes without saying that no sane manufacturer uses it excessively with the idea of cheapening his product. But the same is not true of any of the other statutory ingredients.

The evidence establishes without contradiction that oxide of zinc is very considerably cheaper than carbonate of lead; that oxide of zinc when used *in combination* with carbonate of lead in *certain proportions* is a highly useful pigment; that the limit

of the usefulness of oxide of zinc, when used in paint for outside use, is about 40 per cent. of the total white pigment, and when used in paint for inside use, is about 60 per cent. of the total amount of white pigment. The evidence, however, further shows that oxide of zinc is frequently used largely in excess of these proportions for the purpose of cheapening the paint. And we reiterate in this connection that mixed paint in which oxide of zinc is *the only pigment* used, is within the standard of the statute and need not be labeled.

The evidence also shows that linseed oil, one of the liquids specified in the statute as an allowable ingredient, is very much cheaper than either of the statutory pigments and is often used deliberately beyond the desirable or useful proportion, whereby the paint wherein it is thus excessively used is cheapened and deteriorated.

Any ingredient cheaper than the highest priced lends itself to purposes of cheapening and lowering the quality of paint. We defer further comments to the argument.

But let it be remembered that this charge of usability for purposes of adulteration is limited to the Class B pigments and is not made against any of the Class A pigments.

6.—The Exclusion of Varnish from the List of Allowable Ingredients Is Indefensible and Undefended.

As regards varnish, the bill alleges (Paragraph 20 of Bill; Trans. 13) and the demurrer *admits:*

"That whereas the only ingredients usable as a vehicle or thinning material of mixed paint specified in said act are linseed oil and turpentine, there are conditions under which the use of other liquids as thinning material in connection with or in place of one or the other of said thinning ingredients specified in said act is absolutely essential; that there exists a very large demand for mixed paint which on the one hand is capable of producing a high gloss finish for decorative purposes, and on the other hand offers a specially high degree of resistance to the influence of moisture; that such mixed paint is demanded for the following purposes, among others: for painting carriages, buggies and sleighs; for the painting or staining of floors and other woodwork in the interior of buildings; for the staining, painting, decorating and enameling of furniture and household goods like bath tubs, stoves, stove pipe, picture frames, radiators, bicycles, flower pots; for painting the walls and ceilings of kitchens, laundries, bath rooms, hospital ward rooms, and the like; for painting exposed structural iron surfaces of bridges, stairways, fire escapes and the like; that the high gloss finish or imperviousness to moisture demanded for said purposes cannot be produced by linseed oil or turpentine or a combination of the two, and that varnish is the only thinning material

now known which may appropriately be used as an ingredient of mixed paint to produce said effects."

Notwithstanding these admitted facts, varnish is ignorantly condemned and branded as an adulterant by the statute in question.

F. The Injurious Practical Effect of the Statute.

The injurious effect of the Act is two-fold: *first*, to create a *suspicion and prejudice* against *labeled* mixed paints, which makes their sale difficult and expensive, if not impossible; and, *second*, to impose upon the manufacturers of such paints as under the statute require labeling, the *financial burden* of making analyses of their various products, printing labels for the same, and affixing them to the containers.

This prejudice and this financial burden will not be suffered by the manufacturers of paste paint, whose products need not be labeled. Paste paint however, comes in direct competition with mixed paint, because it can be easily made ready for use by the admixture of thinning material which can be bought, and mixed with the paste paint, by the painter just as easily as by the manufacturer. (See Paragraph 32 of Bill, admitted by demurrer.)

Nor will this prejudice and this financial burden be suffered by the manufacturers of mixed paint containing no other than statutory ingredients. That there are such manufacturers who sell in North Dakota mixed paints conforming to the legislative standard is shown in the affidavit of Professor Ladd

(Trans., 28; Rec., 48, 49). Mixed paints which are required to be labeled necessarily come therefore in competition in North Dakota with mixed paints which are not required to be labeled.

1.—The Suspicion and Prejudice Created.

As to the first mentioned effect the decisive facts are:

(*a*) That the statute is entitled "An Act to prevent the *adulteration* of and deception in the sale of white lead and mixed paints."

(*b*) That the manufacture and sale of mixed paint containing any ingredient other than those specified, unless the same is labeled, is declared a misdemeanor punishable by fine or imprisonment.

(*c*) That the technology of paint manufacturing, and particularly the subject of what are proper ingredients of paint, are of a highly technical nature involving the application of a variety of scientific principles and practical tests and experiments. (Paragraph 17 of Bill of Complaint, Trans., 11.) Hence the general public must be assumed to be ignorant on the subject. Not to educate the public on the value of the useful ingredients excluded by the statute will leave it in ignorance of their merits and cause it to buy only unlabeled paints and to reject paints shown by their labels to contain ingredients branded by the Legislature as adulterants. To educate the public on the merits of the excluded materials is burdensome, difficult and expensive.

On the subject of this first effect of the statute

the bill alleges (Paragraph 28, Trans., 17), and the demurrer *admits:*

"That the said act by specifying linseed oil, pure carbonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors as proper ingredients of mixed paint and making it a crime to manufacture, sell or expose for sale within the State of North Dakota any mixed paint containing any ingredients other than those therein specified as aforesaid, unless such paint be properly labeled, showing the quantity or amount of each and every ingredient used therein other than those specified in said act is intended and calculated to create in the minds of the mixed paint dealers and consumers in the State of North Dakota the erroneous belief that all ingredients of mixed paint other than those specified in said act are adulterants used for the purpose of cheapening the product and add no quality of usefulness or efficiency to the mixed paint wherein they are used; that said act in requiring mixed paint containing any ingredients other than those specified in said act as aforesaid, to be labeled as aforesaid, is a requirement that the manufacturer of and dealer in such paint shall brand the same in such a way as to hold it up to the suspicion and prejudice of the users of mixed paint, and thereby make the sale thereof in said State, if not impossible, at least more difficult and expensive."

2.—The Expense of Analyzing and Labeling.

The second effect of the act above mentioned arises from the fact (Paragraph 34 of Bill; Trans. 19), *admitted* by the demurrer:

"That each of your orators manufactures scores of different kinds and shades of mixed paint differing from each other in chemical composition; that even the same kind and shade of mixed paint manufactured by any one of your orators has no fixed chemical composition, but varies in such composition from time to time and practically with each lot manufactured, by reason of the wide variations in the chemical composition of the constituent ingredients, more especially the chemical composition of the dry colors used; that in order to properly label the cans of mixed paint manufactured by your orators and sold in North Dakota showing "the quantity or amount of each and every ingredient used therein, and not specified' in said act, each of your orators would have to have a chemical analysis made of each lot of mixed paint before putting the same up in cans or other containers; that the expense of making such analyses and printing labels showing the same, and affixing such labels to the cans or other containers would add materially to the cost of manufacture."

To further elucidate and explain the allegation in the paragraph just quoted, "that even the same kind and shade of mixed paint manufactured by any one of your orators has no fixed chemical composition, but varies in such composition from time to time and practically with each lot manufactured,

by reason of the wide variations in the chemical composition of the constituent ingredients, *more especially the dry colors used,*" we beg to quote the following from the *admitted* allegations of paragraph 23 of the bill (Trans., 15):

"That even among such dry colors last aforesaid sold by different dry color manufacturers or dealers *under the same designation,* there are the widest variations in shade, composition and strength; that the statement last made is particularly true of dry colors composed of or produced from natural earthy deposits, like the colors known as umbers, siennas, ochres and oxides of iron, in which the finished product varies and necessarily varies according to the location of such deposits and, from year to year or from season to season, according to the depth at which such deposits at a particular location are worked; that, for instance, the percentage of iron oxide contained in Italian siennas varies from less than forty-six to upwards of sixty-seven, and the percentage of silica therein varies from less than six to upwards of twenty-two; that the percentage of iron oxide in umbers varies from less than twenty-three to upwards of forty-one; that one of the highest types of domestic ochre most largely used by manufacturers in the United States at the present time contains only about fifteen per cent. of iron oxide, while other domestic ochres of less painting value contain as much as forty-six per cent. of iron oxide."

G. The Injury Threatened to the Complainants.

That the provisions of the statute injuriously affect the complainants appears from the allegation of Paragraph 14 of the Bill (Trans., 10), which is admitted by the demurrer, that each of the complainants "manufactures and, directly or indirectly, sells in the State of North Dakota mixed paints containing ingredients other than those specified in the statute"; also from the allegations contained in Paragraphs 1 to 11 of the Bill (admitted by the demurrer), showing that each of the complainants has built up in North Dakota a large trade in the mixed paints manufactured by them respectively, and that the value of such trade and of the trade name attaching to their brands of mixed paint sold in said State, respectively, varies from $10,000 to $50,000; also from the further allegation in Paragraph 13 of the Bill (Trans., 10), which is admitted by the demurrer, that the defendant "*has threatened to enforce and is about,* by himself, his assistants, experts and agents, *to enforce* all the provisions of said act, and to exercise all the power conferred upon him and them by said act."

It is further alleged in Paragraph 35 of the Bill (Trans., 19, 20), and admitted by the demurrer, that unless the enforcement of said act be enjoined and said act be declared void, "the dealers in mixed paint in said State who will in the future purchase such mixed paints manufactured by your orators or any of them and not labeled as required in said act as well as the distributing agents and salesmen of your orators selling such mixed paint in the future

in the State of North Dakota, will be subject to criminal prosecution; that thereby a multiplicity of criminal prosecutions will ensue, the proper determination of all of which would involve the construction and the question of the validity of said act; that for fear of such prosecutions many of said dealers will refuse to buy such mixed paints manufactured by your orators and not conforming to the specifications of said act, unless labeled as required by said act, whereby incalculable and irreparable damage will be caused to your orators; that practically all the mixed paint manufactured by your orators, respectively, and sold to dealers in the State of North Dakota is as a matter of established custom, sold to said dealers on credit; that many of said dealers who will in the future purchase such mixed paints manufactured by your orators, respectively, and not labeled as aforesaid will refuse to pay for the same to your orators, respectively, or to their respective distributing agents on the ground that said paints were sold contrary to the provisions of said act, and are unsalable by them in said state under the provisions of said act, whereby your orators and their respective distributing agents will be compelled to resort to a multiplicity of civil suits to enforce such payments, all of which suits would involve the construction and the question of the validity of said act; and if your orators should label the mixed paints manufactured by them respectively as required by said act your orators would not only be subjected to the loss and expense of analyzing and labeling their products, respectively, as hereinabove shown, but said products will be held up to the suspicion and prejudice of the

dealers in and users of mixed paint in said State, which suspicion and prejudice will make it either impossible or at least more difficult and expensive for your orators, to sell their said products in said State, all of which would produce incalculable and irreparable injury to your orators; that few, if any, dealers in mixed paint in said State who by reason of their respective stocks of mixed paint on hand are now subject, or who may in the future become subject, to criminal prosecution under said act will have a sufficient interest or be able to successfully raise the defense of the invalidity of said act, inasmuch as such defense involves the consideration of the complex state of facts hereinabove set forth. Wherefore your orators have reason to fear and do fear that many or most of said prosecutions will result in convictions, and that by such convictions the various brands of mixed paints involved therein, respectively, will be branded in the State of North Dakota as adulterated and illegal products, and will thereby be rendered unsalable, all of which will produce incalculable and irreparable injury to your orators, and will constitute the taking of your orators' property without due process of law and the denial to them of the equal protection of the laws."

All of these consequences resulting from the threatened enforcement of a statute which, if it is unconstitutional, the complainants need not obey, they are entitled to an injunction to prevent irreparable injury to them and a multiplicity of suits, both criminal and civil.

H. The Questions of Law.

The questions of law arising upon the foregoing facts are as follows:

1. Is it a proper exercise of the police power to fix a standard of purity for an article of commerce which is an artificial compound not intended to be used as food, drink or drug, and not otherwise harmful, which can be made of equal efficiency by the use of various ingredients in varying proportions; which must of necessity be made of different ingredients depending upon the particular uses to which it may be put, the fancy or taste of the user, the atmospheric conditions to which it is to be exposed; the efficiency of which depends not only upon the ingredients used, but equally upon the proportions in which they are combined and upon mechanical processes of manufacture; for which article there exists neither a natural standard of purity nor a generally or widely accepted standard of purity?

This question is raised by the allegations of Paragraph 27 of the bill (Trans., 16), which are admitted by the demurrer and are as follows:

"Your orators further show unto your Honors that the only purposes for which paint is used are to preserve and beautify; that is to say, to protect the painted material from the destructive effect of exposure to atmospheric conditions and the action of the elements, and to make the surface more pleasing to the eye; that that paint is the most efficient which

accomplishes these purposes in the highest degree for the longest time; that any ingredient which tends to enhance the efficiency of paint or give it a useful quality is a proper ingredient; that there is no natural standard of purity of paint, nor is there a generally or even widely accepted standard of purity of paint; that any enumeration of allowable ingredients of paints short of an exhaustive enumeration of all ingredients which may under particular circumstances or conditions give to paint a useful quality, is necessarily unjust and unreasonable; that even such an exhaustive enumeration in the light of the knowledge of the technology of paint manufacturing of to-day is liable to become unjust and unreasonable by to-morrow's discoveries; that the use of none but useful ingredients in the manufacture of paint is not in itself sufficient by any means to insure efficient paint; that in order to insure efficiency not only must proper and useful ingredients be combined in proper proportions widely varying according to the material to be covered, the shades to be produced, the climatic conditions to which it is to be exposed and many other conditions and circumstances, but such ingredients must also be subjected in the manufacture to the proper mechanical processes required to produce the complete blending of the combined ingredients both solid and liquid, which in turn is indispensable to insure durability, opacity, covering property, consistency and proper spreading quality of the paint, its proper action under the brush, and many other important qualities; and your orators therefore charge that for the reasons aforesaid it is impossible logically to speak of a standard of purity as applied to paint, nor is it reasonable

for any statute to attempt to set up a standard of efficiency of paint by an enumeration of allowable ingredients, the only test of the efficiency of paint being its ability to serve the purposes for which it is intended."

2. Supposing that the Legislature for the purpose of preventing fraud has the power to prescribe a limited number of allowable ingredients for such an artificial compound, is it a reasonable and valid exercise of this power to fix a standard which, by reason of its purely negative character (i. e., its failure to require that all allowable ingredients essential for efficiency be used and its failure to prescribe maximum and minimum percentages) and its enumeration among the allowable ingredients of a material which cannot possibly be used (i. e., pure carbonate of lead) is so vague as to furnish no basis of comparison, and which by its uncertainty and latitude permits of the manufacture and sale, under the special sanction of the law, of that which is inefficient, useless and a fraud upon the purchaser?

This question is raised by the bill in Paragraphs 22 (Trans., 14) and 30 (Trans., 17, 18).

Paragraph 22, after alleging that pure carbonate of lead, one of the allowable ingredients under the statute, is unfit for use in paint, says:

"Your orators, therefore, charge that said Act in enumerating 'pure' carbonate of lead among the specified ingredients of mixed paint and prohibit-

ing, as a crime, the use of the commonly used commercial carbonate of lead without specifying on a label the quantity or amount of each of its ingredients, is unreasonable and void."

Paragraph 30 of the bill is as follows:

"Your orators further show unto your Honors that while said act was intended to be a police regulation for the prevention of fraud, its provisions are such that it has no tendency to accomplish such end; that said act, by failing to specify the maximum or minimum of the proportionate amount of the ingredients specified in said act which are to be or may be used in mixed paint, permits of the manufacture and sale, without any label whatsoever, of mixed paint containing said ingredients in such proportions as to make it absolutely inefficient and useless and a fraud upon the purchaser."

3. Is the condition of reasonableness in the exercise of the police power met by a statute which, in its enumeration of allowable ingredients of such an artificial compound as hereinabove mentioned, excludes materials which constitute useful, efficient, harmless and, in some cases, most essential ingredients for use in such compound, which are commonly used by the most advanced and most succesful manufacturers of such compound, and without the use of which such compound cannot be made as efficient as it can be made by using them.

This question is raised in Paragraph 18 (Trans., 12) and Paragraph 21 (Trans., 13, 14) of the bill.

Paragraph 18 of the bill is as follows:

"And your orators, therefore, charge that said act, in condemning inferentially the use of sublimed lead, standard zinc lead white, zinc made from western ores, lithopone, sulphate of barium, silica, silicate of magnesia, calcium carbonate and hydrated sulphate of lime as ingredients of mixed paint and branding them as adulterants, ignores the fact that all said substances constitute proper, useful and necessary ingredients of paint, is based upon antiquated, obsolete and quite generally discarded prejudices regarding the ingredients proper, useful and necessary to be used in paint, and is therefore unreasonable and void."

Paragraph 21 of the bill is as follows:

"And your orators therefore charge that said act, in specifying only linseed oil and turpentine as ingredients proper to be used as thinning vehicles in mixed paints and in excluding varnish and thereby inferentially branding it as an adulterant, is unreasonable and void."

4. We have seen that the classification of the statute is between mixed paints containing no ingredient other than those specified and mixed paints wherein any unspecified ingredient is used. We have seen that innumerable varieties of absolutely inefficient mixed paint come within the purely negative standard set up and thus escape the requirement of labelling. We have also seen that paste paint need not be labelled. We have seen that the sole discoverable purpose of the statute is to

protect users of paint from having imposed upon them inferior brands of paint, which danger exists in cases of paste paint and in cases of mixed paint falling within the negative standard of the statute in the same degree as in cases of mixed paint not falling within this standard. It being admitted that the labelling of paint pursuant to the requirements of the statute not only makes its sale more difficult and expensive by reason of the suspicion and prejudice against labelled paints created by the statute, but also imposes a financial burden by reason of the expense of making analyses and printing and affixing labels, the question arises: Is it a valid exercise of the police power to exempt from this financial burden the manufacturers of paint who use therein no ingredient other than those specified in the statute, and to likewise exempt therefrom the manufacturers of paste paint, while placing this burden upon the manufacturers of mixed paint who use therein any ingredient or ingredients other than those specified in said Act, where all these classes of paint and these classes of manufacturers come in direct competition with each other.

This question is raised by the following allegation of the bill (Paragraph 34, Trans., 19):

"That the expense of making such analyses and printing labels showing the same, and affixing such labels to the cans or other containers would add materially to the cost of manufacture and would

impose an unjust and unreasonable burden upon the manufacturer of *mixed* paints containing other ingredients than those specified in said act, whereas the manufacturer of *paste* paint as well as the manufacturer of mixed paint containing only ingredients specified in said act would be free from such burden; that the imposition of said burden upon your orators as manufacturers of mixed paint containing other ingredients than those specified in said Act deprives them of property without due process of law, and denies to them the equal protection of the laws, contrary to the Fourteenth Amendment to the Constitution of the United States."

5. Assuming that the evidence establishes the correctness of the allegations in Sub-Paragraph a of Paragraph 17 of the bill as to the usefulness of any one or more of the Class A pigments, the question arises: Is the statutory discrimination against them nevertheless justfied by the fact that there are some manufacturers who decline to use them because, by reason of their comparatively recent introduction upon the market as articles of commerce, they have not had an opportunity to become convinced of their usefulness and efficiency. In other words, is the comparative newness of a material proven to be equally as useful, efficient and unobjectionable as an older material, a reasonable ground for discriminating classification? Or does the fact that some manufacturers have been too

lazy or conservative to try and test such a new material justify such discriminating classification?

This question is raised by Paragraph 2 of the defendant's answer hereinabove quoted and the complainants' replication thereto.

6. Assuming that the evidence establishes the correctness of the allegations of Sub-Pargraph b of Paragraph 17 of the bill as to the usefulness of any one or more of the Class B pigments, the question arises: Is the statutory discrimination against them nevertheless justified by the fact that they are cheaper than the statutory pigments and that, for the purpose of cheapening their product, some unscrupulous manufacturers use them in excess of the proportion up to which they are useful, when the evidence shows that one of the statutory pigments, oxide of zinc, being considerably cheaper than carbonate of lead, is with at least equal frequency used in excess of the proper proportion for the same ulterior purpose?

This question is raised by Paragraph 4 of the defendant's answer hereinabove quoted and the complainants' replication thereto.

PART II.

ERRORS RELIED UPON.

The assignment of errors filed in the court below in connection with the petition for appeal contains the following specifications (Trans., 428, 429):

I.

"That said Circuit Court erred in entering said final decree, order and judgment dismissing the bill of complaint for want of equity.

II.

That said court erred in denying the motion of complainants for a preliminary injunction pending the final hearing of said cause.

III.

That said court erred in not making, rendering and entering a decree in favor of the complainants and against the defendant, finding the statute of the State of North Dakota described in the bill of complaint in said cause to be unconstitutional and void.

IV.

That said court erred in finding and holding that the statute of the State of North Dakota described in said bill of complaint was constitutional and not in contravention of the Fourteenth Amendment to the Constitution of the United States.

V.

That said court erred in not granting the relief prayed for by complainants in their bill of complaint and entering a final decree in accordance therewith."

Little can be added to the above specification by way of stating more particularly in what the decree is claimed to be erroneous. The court below, adopting the theory of the answer, held that the statute in question was not repugnant to the Fourteenth Amendment. As the complainants were entitled to the injunction for which they prayed only in case the statute was found unconstitutional, the decree dismissing the bill for want of equity is right, if the statute is valid. Hence, the only error which we rely upon and intend to urge, is the failure of the Circuit Court to hold the law to be unconstitutional.

PART III.

BRIEF OF THE ARGUMENT.

DIVISION 1.

BRIEF OF THE CONTESTED POINTS OF FACT.

NOTE: Only the allegations of paragraph 17 of the bill are controverted and only the points raised there and in the answer of the defendant to that paragraph will be noted.

A. Introductory: The Qualifications of the Witnesses.

The order of reference under which the evidence was taken provided "that the number of witnesses to be examined shall be *limited to three* to be called by the complainants and *three* to be called by the defendant." (Trans., 73; Rec., 107.) Under these conditions it was impossible for the complainants to establish their contentions through the greater number of witnesses. The greater weight of the evidence could only be obtained through the superior qualifications of the witnesses, their superior standing as experts in the chemistry or technology of paint making, their superior practical knowledge gained through tests and experiments, and their greater disinterestedness in this case.

1.—The Qualifications of Complainants' Witnesses.

(a) Dr. Charles Benjamin Dudley is chief chemist of the Pennsylvania Railroad, having twelve assistants under him in his department. He has been chemist of that road for more than thirty years. After studying general science, but principally chemistry, at Yale University he obtained there the degree of Bachelor of Arts in 1871 and the degree of Doctor of Philosophy in 1874. He has been a member of the American Chemists' Society for a number of years and for two years its president. He is a member of the Iron and Steel Institute of Great Britain, of the London Chemical Society, of the Société Chemique of Paris, of the German Chemists' Society and of the American Society for Testing Materials. Of the latter society he was president at the time of testifying. The Pennsylvania Railroad system *is not a manufacturer, but a very large user of paint.* It spends nearly a million dollars per year for paint material. A quarter and maybe a third of this sum is spent for *mixed paints.* There have been made in Dr. Dudley's laboratory and under his supervision a large number of examinations and analyses of mixed paints. Under his supervision and observation physical tests were made of the wearing quality and other qualities of paints which were mixed in his laboratory for experiment. For a portion of the paint purchased by the road there are printed specifications prepared by Dr. Dudley. Every shipment of paint bought according to specifications is examined in the laboratory before it is used. Frequently paints

bought not according to specifications, but upon the reputation of the maker, are analyzed in his laboratory for information. Among the surfaces painted in the work of that road are freight cars, passenger cars, all buildings along the track, station houses, water stations, fences and bridges. (Trans., 74 to 76; Rec., 110 to 113.)

(b) MAXIMILIAN TOCH has for nineteen years been a paint manufacturer in New York City. He manufactures between 20,000 and 25,000 gallons of mixed paint per month, but *sells no paint in North Dakota;* has two degrees from New York University; studied chemistry under Wallace Goold Levison from 1882 to 1886, also for three years with Prof. Heitzmann, formerly of the University of Vienna; studied microbatory micrology and bacteriology for two years with Prof. Jeliffe; is a member of the American Chemical Society, the Society of Chemical Industry of England, the Chemists' Society of Germany, the Society of Medical Jurisprudence of New York, the Society of Civil Engineers, the Society for Testing Materials, the Electro-Chemical Society, and the Chemists Club of New York. Since beginning to manufacture paint he has kept informed of the progress of chemistry and worked in his chemical laboratory. He is frequently called on by other paint manufacturers in the United States to give expert advice as to the proper ingredients and percentages of ingredients to be used in paint. He is generally regarded by paint manufacturers as an expert on the technology of paint manufacture. He has made a great many analyses of the various pigments used in paint and many an-

alyses of mixed paints. He has had large and varied experience in making physical tests and experiments as to the quality of paints when subjected to exposure. He has made many tests in having fences and bridges and metal structures painted in order to determine for himself the actual conditions which would take place after severe chemical exposure. In addition to this he has made a great many hundred exposure tests on the roof of his laboratory. He has made examinations of the Class A pigments and is acquainted with the properties and qualities of the Class B pigments. (Trans., 111 to 113; Rec., 181 to 184.)

(c) Frank A. Lane is not a chemist, but a practical paint manufacturer. In 1885, at the age of fifteen, he went into a paint manufacturing establishment at Toronto. He started in the packing room of the mixed paint department, worked through the making rooms, the grinding rooms and the mixing rooms, and at the age of twenty-one was made superintendent of the factory. Two years later, in 1893, he accepted the position of superintendent of the McLennan Paint Company at Buffalo. Obtaining a leave of absence in September, 1899, he was employed for a year as expert for a concern in London, England engaged in the manufacture of paints, colors, varnishes and lubricating greases. From October, 1900, until March, 1905, he again was superintendent of the McLennan Paint Company. Then, for a month, he visited various manufacturers of the United States to become familiar with their methods and to compare notes. Since April, 1905, he has been employed by the

Patton Paint Company, of Milwaukee, one of the complainants, in the capacity of "manager of manufacturing trades." This department is entirely separate from the *mixed paint* department of the Patton Paint Company. *He has nothing to do with the latter department and does not even know the formulas.* (Trans., 189; Rec., 322.) As superintendent of the McLennan Paint Company he had charge of the formula department, which included experimental rooms and laboratories. He was responsible for all the raw material from the time it was received in the factory until it left in the shape of the finished product; in other words, he had entire charge of the manufacturing. Immediately upon taking charge of the McLennan Paint Company's factory he began a series of tests with the various paint materials. These tests consisted of examining the materials, rubbing them up under the knife to get familiar with their structure, grinding them in a practical way. thinning them out, applying them to surfaces and, if the materials were intended for exposed work, exposing them. These tests were carried on all the time he was with the McLennan Paint Company. The result of exposure in all these tests was observed from time to time until it was determined whether the material tested was useless or valuable. If valuable, the exposure was continued until definite conclusions had been reached. At one time as many as 1,300 different samples were thus exposed. They were combination samples of different materials and in different proportions. Such exposures were continued for periods varying from one month to eight years. He has made tests with all the white pigments, includ-

ing the statutory, the Class A and the Class B pigments, both in their commercial state and as ingredients of paint. (Trans., 150 to 153; Rec., 253 to 258.)

2.—The Qualifications of Defendant's Witnesses.

(a) E. F. Ladd is professor of chemistry in the North Dakota Agricultural College and chemist of the North Dakota Government Agricultural Experiment Station. We admit he is thoroughly trained in *general chemistry*. His acquaintance with the special branch of *paint chemistry* and the technology of paint making is, however, purely theoretical and of very recent acquisition. Prior to introduction into the Legislature of North Dakota of the bill which afterwards became the statute under consideration, he had made some analyses of paints, sometimes owing to disputes and in other cases when interested parties desired to know the composition of some sample of paint. The number of these analyses would probably average *six to eight samples a year*. (Trans., 213; Rec., 365, 366.) He has tried to acquaint himself with the leading text books on the subject and has them on the shelves of the college library. (Trans., 214; Rec., 366, 367.) With the exception of becoming familiar enough with the subject so as to be able to give the *methods of analyses* to his students and *analyzing* special samples which came in, Professor Ladd had made *no special study of the subject prior to* 1905 and the special text books in the college library were gathered only during 1905. Asked whether prior to 1905 he would have undertaken to testify as an expert on

the properties of pigments, he answered in the negative. Prior to 1905 he could not have told, without looking it up in some work of reference, what is the characteristic composition or what are the qualities of the Class A pigments. (Trans., 230, 231; Rec., 398 to 401.) Only as much time was devoted to the study of the subject since the passage of the statute as was left to Professor Ladd after performing his duties as professor at the college, acting as Pure Food Commissioner for North Dakota and editing a newspaper and writing articles for it. (Trans., 232; Rec., 403, 404.) It was in June, 1905, that he began making analyses of paints preparatory to the enforcement of the paint law. (Trans., 232; Rec., 403.) These analyses were in 1905 confined in the main to white paints. Since November, 1905, he has also analyzed gray paints. (Trans., 233; Rec., 404.) Outside of making chemical analyses Professor Ladd admits that he never made any tests or experiments with paints containing a variety of combinations of the different white pigments. (Trans., 234; Rec., 407.) He has never made any test how any particular paint works under the brush. Outside of observing how the paint on his own home behaved under exposure, he has never made any exposure test or observed how a paint whose composition he knew behaved under exposure. (Trans., 234, 235; Rec., 407, 408.) Throughout his testimony he uses such phrases as "it is reported" or "it is considered" or "it is supposed." He admits his testimony is *purely hearsay,* based upon what he has gathered from books and other sources. (Trans., 267; Rec., 468.)

After Professor Ladd had in his direct testimony quoted copiously from the works of George H. Hurst, whom he had declared to be one of the leading paint chemists of England (Trans., 237; Rec., 412), we introduced on his cross-examination the following passage from the same author which tends to characterize Professor Ladd's lack of preparedness to give expert testimony on the comparative value of pigments (Trans., 272; Rec., 477):

> "A thorough knowledge of the chemistry of pigments and paint materials is not to be gained by simply reading about them in text books, however good these may be, but by working them and experimenting with them under all circumstances and conditions."

Professor Ladd admits himself that physical properties of paint materials can be determined only through practical tests. (Trans., 246, 247; Rec., 432 433.)

His practical experience is limited to the making of quantitative analyses of white and grey paints. But even his knowledge of this subject is deficient as appears from the following admission on his direct testimony:

> "Q. Do you know of any chemical test to which you could have subjected that ingredient of the paint in order to determine with certainty whether it was sublimed white lead or was sulphate of lead?
>
> A. With my *present knowledge* I could not." (Trans., 226, 227; Rec., 391, 392.)

Contrast with this the expertness of Mr. Toch, who says he can always differentiate between these ingredients and minutely describes the chemical test. (Trans., 383, 384; Rec., 665 to 667.)

Professor Ladd's testimony on cross-examination is practically a continuous series of either admissions of our contentions or of admissions (wormed out of him, to be sure) that he has no knowledge on the subject. In some instances he says he has no knowledge because he has made no practical tests, and in others because his theoretical studies have not gone far enough. So far as in his testimony he expresses any adverse opinion on the value of the Class A pigments, he is flatly contradicted by statements in a certain bulletin on paint and paint products published by him a few weeks before he testified. This bulletin was attached by him as an exhibit to his affidavit filed in the case on January 5, 1906. Certain passages of this bulletin were introduced by us in evidence for the purpose of contradicting Professor Ladd's testimony. (Trans., 245, 246; Rec., 431.) Some of these admissions will hereafter be referred to.

Professor Ladd's criticisms of Class A pigments and Class B pigments is further destroyed by the admission made by him upon cross-examination (Trans., 282, 283; Rec., 495) that in a public speech made by him just one week before he testified in this case he had stated that for aught he knew, a combination between Class A pigments and Class B pigments might have merit and might be equal to white lead and zinc oxide paint in its working qualities, though its chemical qualities are entirely different from those of white lead.

(b) Berger M. Joystad is superintendent of the paint factory of T. L. Blood & Co. at St. Paul; has held that position for twenty-two years; before that

time had charge of the mixed paint department and advertisements with the Heath & Milligan Company of Chicago. As superintendent of T. L. Blood & Co. he has charge of testing the colors and materials of all kinds and descriptions. (Trans., 300 to 302; Rec., 527, 528.) On direct examination he asserts that he has tested and familiarized himself with the statutory and the Class A pigments and reached conclusions as to their value in the preparation of mixed paints. (Trans., 302; Rec., 529.) On cross-examination he admits that it is *at least fifteen years* since last his concern bought sublimed white lead (Trans., 310; Rec., 541), which is most significant in view of the fact that this material was then but just introduced in the market and has since then been perfected. He admits that he has *never made an experiment* with zinc lead white as an ingredient of *mixed* paint (Trans., 318; Rec., 554), and says that he does not feel qualified to speak about the qualities or properties of zinc lead white used in mixed paint. (Trans., 319; Rec., 556.) He admits that he has never used lithopone as an ingredient of mixed paint intended for inside use (*i. e.*, use on the inside of buildings), and never tried lithopone as an ingredient of mixed paint intended as a floor paint. (Trans., 321; Rec., 558.) He is neither a chemist nor does his concern employ a chemist. (Trans., 321; Rec., 559.) He admits that he has never experimented with American lithopone at all. (Trans., 322; Rec., 560.) Having testified on direct examination that lithopone cannot be used in combination with any copper pigment (Trans., 306; Rec., 535), it developed on cross-examination that he believed that the coloring pigment known

as chrome green is composed of copper. The next moment he admits he was thinking of Paris green and that he had gotten mixed (Trans., 322, 323; Rec., 561, 562), but the fact is that "Paris green would be simply ridiculous to use as a tinting color." (Testimony of Mr. Toch, Trans., 376; Rec., 653.)

Mr. Joystad in his cross-examination further admits that he has never tested any of the Class B pigments, except barytes, as an ingredient of mixed paint. (Trans., 324, 325; Rec., 564, 565.)

Some parts of the testimony of Mr. Joystad read like a paragraph in the comic supplement of a Sunday paper or like a colloquy in a show of Weber and Fields. Many of his answers show that he utterly failed in understanding the questions put to him. An illustration—*unum e multis*—will make this clear. On direct examination the following occurred (Trans., 302; Rec., 530):

> "Q. What are the desired qualities, valuable qualities, of carbonate of lead as a pigment in the preparation of paint?
>
> A. Well, to my knowledge it is the leading pigment of them all; you can call it the king of all pigments.
>
> Mr. ZEISLER: I move that the answer be stricken out as not responsive to the question.
>
> Q. What are the qualities as to opacity, durability or other particulars which in your mind entitle it to be denominated as the king of all pigments?
>
> A. That is carbonate of lead.
>
> Q. Which are the qualities which entitle it to that name?
>
> A. Well, carbonate of lead and oxide of lead."

A perusal of the entire testimony of Mr. Joystad cannot fail to convince any one of the fact that he is an ignorant illiterate man, steeped in antiquated notions and prejudices, unwilling to open his eyes to the truths of modern investigation and achievement. The unprogressive character of his employer is illustrated by the fact that he does not employ a chemist. Notwithstanding this, as will appear from frequent references hereinbelow, Mr. Joystad's admissions on cross-examination are in themselves sufficient to substantiate everything which is essential to our contentions.

(c) James Robert Cook is and for twenty years has been superintendent of the Minnesota Linseed Oil and Paint Company at Minneapolis. In this capacity he makes all the formulas for their paints. (Trans., 335, 336; Rec., 584 to 586.) Asked whether to him is committed the determination of the ingredients to be used in the preparation of mixed paints, he says: "I am, with Mr. Ramsey's advice. Sometimes he won't let me use what I want to." (Trans., 337; Rec., 586.) Mr. Ramsey is the president of the company. (Trans., 360.) Apparently he is even more unprogressive than his superintendent. That the latter has not even a speaking acquaintance with the Class A and the Class B pigments appears from the following testimony given on *direct* examination (Trans., 338, 339; Rec., 589):

> "Q. Are you able to name any other substance which used as pigments will produce as useful and valuable and durable a mixed paint for outside purposes as carbonate of lead and oxide of zinc?
>
> A. There may be others, but I don't know.
>
> * * * * *

Q. Have you been trying to find out, during all these years, what are the pigments that are the most valuable and that will produce the most satisfactory paint?

A. All the change we have made is to change from poor zinc to better. We never have tried anything else, only the carbonate of lead and zinc oxide.

Q. Well, why haven't you tried the others?

* * * * *

A. Well, now, we think that we have got along as well using what we have that we haven't dared to risk anything else *without a good deal of experimenting, which we haven't done.*"

On cross-examination Mr. Cook admits that during the twenty years he has been in the factory, they have made no practical tests or experiments and especially no exposure tests with any paint except combinations of the two statutory pigments in varying proportions, and combinations of carbonate of lead and zinc from western ores. (Trans., 347 to 349; Rec., 605 to 607.) The attitude of this witness and his employer cannot be better characterized than by the following quotation from his cross-examination (Trans., 351; Rec., 611):

"Q. In other words, you did act upon the principle of letting well enough alone?

A. Yes, sir.

Q. You were making a paint that found a ready sale and you thought it was satisfactory paint and you didn't try to improve it?

A. No. Well, I wasn't allowed to try. I often would, but I wasn't allowed to.

Q. Mr. Ramsey stood in the way?

A. Yes, sir.

Q. He is still more conservative than you are, is he?

A. Yes, sir. He didn't want me to fool away my time with it."

It would almost seem that the selection of the defendant's witnesses was made upon the theory that a vision undimmed by investigation or knowledge is a special qualification for an expert witness. It is in perfect accord with the theory of the defense that a ground for legislative discrimination is furnished by the ignorance of some men who, by investigation, would have found the truth as to the value of the ingredients discriminated against.

The great value of the testimony of the defendant's witnesses is, however, in their admissions as to the vital defects of the statutory ingredients with which they are acquainted.

B. The Test of the Merit of a White Pigment.

A proper understanding of the testimony on the qualities of the various white pigments will be greatly aided by a brief consideration of those desirable qualities to be possessed by paint which are expected to be furnished to it by the white pigment ingredients in contradistinction to those qualities of paint to be furnished by the liquid ingredients and the coloring matter. Wherever in this consideration a statement is obviously correct or where we are confident that it will not be controverted, we refrain from giving references to the record.

In this consideration it must be kept in mind that "the only purposes for which paint is used are to *preserve* and *beautify;* that is, to say, to *protect* the painted material from the destructive effect of exposure to atmospheric conditions and the action of the elements, and to make the surface *more pleasing* to the eye; that that paint is the most efficient which

accomplishes these purposes in the highest degree *for the longest time.*" (Paragr. 27 of bill, admitted by demurrer.)

It is not controverted that the purpose of protection is more important than the purpose of beautifying. Even Professor Ladd admits this (Trans., 270; Rec., 474):

> "Q. Which do you regard as the most important function of paint, to beautify or to protect?
>
> A. Well, we consider both as essential for the greatest satisfaction, but, so far as the property is concerned, the protection.
>
> Q. The protection would be regarded by you as the more important quality, would it not?
>
> A. In most cases, yes."

While the protective quality of paint is furnished to it in part by the linseed oil, it is more particularly expected to be furnished by the white pigments.

The purpose of beautifying is only next in importance to the purpose of protection. The purpose of beautification cannot be accomplished except by hiding the surface, covering up any blemishes thereon. In other words, the paint must be *opaque*. Opacity cannot be furnished by the liquid ingredients of paint. In numerous of the darker shades or tints (colored paints) the coloring material alone furnishes all the necessary opacity. In numerous other shades or tints the coloring matter assists in furnishing the opacity. In a very large class of paints, however, that is to say, in all the whites and the lighter shades, the necessary opacity can only be furnished by white pigments. Thus *opacity or hid-*

ing power becomes an important quality of white pigments for many kinds of paint.

There is not, so far as the evidence shows, any difference between the different white pigments (the statutory, the Class A and the Class B pigments) as to their *initial* quality to serve the purpose of protection. There is, however, a great difference between them as to the *length of time* for which they are capable of serving this purpose. There is a difference between them as to the degree of durability, some being more liable to disintegration and destruction from natural causes than others. Some white pigments disintegrate within a very few years, while others are practically indestructible. When a paint layer is destroyed or broken up through the disintegration of the pigment matter it contains, it ceases to serve not only the purpose of protection but also the purpose of hiding or beautifying the surface. (Trans., 169; Rec., 286.) Thus the power of a pigment to resist disintegration from chemical reaction or mechanical influences, or, in other words, *durability,* becomes the most important quality of a pigment, more important than the quality of hiding power or opacity.

As paint is not supposed to last forever, it is important that, in case repainting becomes necessary or desirable, the former paint layer should be in proper condition to be painted over. Otherwise it would be necessary to first remove the old paint layer before repainting can safely be done. Some pigments are liable to such form of disintegration as to cause the paint in which they are used to leave a surface more or less unfit for repainting. Other

pigments have no such effect. *Leaving a surface suitable for repainting* is therefore an important quality of paint which depends upon what white pigments are used. (Dr. Dudley: Trans., 79; Rec., 119; Toch: Trans., 124; Rec., 205.)

In case of white paint and the very light tints it is important that the white pigments used should have the qualities of *good initial whiteness,* as well as *permanence of whiteness* when exposed to light or atmospheric influences. These qualities are of *no importance in paints other than whites and light tints.* (Ladd: Trans., 265; Rec., 464, 465. Joystad: Trans., 318; Rec., 554; Trans., 322; Rec., 560, 561. Lane: Trans., 161, 162; Rec., 273, 274. Toch: Trans., 367; Rec., 637.)

The qualities heretofore mentioned refer to paste paint as well as to mixed paint. One other quality should be mentioned which is of considerable importance *only in the case of mixed paint.* The cans in which mixed paint is put up often remain on the shelves of the jobber, but more particularly of the retailer, for varying periods of time. Certain pigments have the tendency to separate from the thinning vehicle and settle at the bottom of the container. Sometimes a little stirring up will restore the original condition of suspension. Sometimes, however, the pigment settles so hard at the bottom of the can that it either cannot readily be stirred up at all or, even if it can be stirred up, the paint is liable to be stringy and tough. In such cases the purchaser of the paint raises a just objection. For this reason the quality of a pigment not to harden or settle but *remain in proper suspension* becomes

of great importance in mixed paint. (Lane: Trans., 165; Rec., 279, 280. Dudley: Trans., 85; Rec., 130. Ladd: Trans., 243; Rec., 425.)

The merits of a white pigment for use as an ingredient of mixed paint are therefore to be tested by the following qualities to be furnished to paint by the ideal white pigment:

1. **Durability.**
2. **Opacity.**
3. **Leaving a surface suitable for repainting.**
4. **Remaining in suspension in the can.**

As applicable only to white paint and very light tints:

5. **Initial whiteness.**
6. **Permanence of color.**

While the *white pigment body* of all good mixed paint should possess all the four qualities first above mentioned, and in the case of whites and very light tints should also possess the fifth and sixth, it is neither necessary nor to be expected that all these qualities should be furnished by *any one* of the white pigments. It is a conceded fact that neither of the statutory pigments possesses *all* these qualities. Paint is a compound. It is composed of various elements an intimate combination of which is supposed to give it all the qualities it should possess. If *any one* pigment is capable of furnishing *all* these qualities to the paint, it must be conceded to possess special merit from the *point of view of the manufacturer,* who by using it is saved the trouble and ex-

pense incident to the mechanical process required to produce the complete blending of a *combination* of pigments. But we are not interested, and the statute does not concern itself, with the manufacturing problem. Manifestly the only object of the statute is to protect the *user of paint* in obtaining a good finished product. If two brands of the finished product are equally efficient in every respect, the *user* is not interested in the question whether the good qualities of the paint are due to the presence of *one* pigment alone, or of a *combination* of pigments. With probably one exception (sublimed white lead), every known pigment standing alone is incapable of furnishing to paint *all* the desirable qualities above mentioned. Some are deficient in durability, some are deficient in opacity, some are deficient in permanency of color, etc. It is, therefore, necessary to combine two or more pigments in proper proportions so as to produce a paint possessing in the highest degree practically attainable all the qualities which paint should have. If, for instance, a pigment possesses a high degree of opacity but is deficient in durability, it would, if used alone, be most unsatisfactory. If, however, it is combined in proper proportions with another pigment possessing a high degree of durability, though deficient in opacity, the combination will effect a satisfactory result.

The proper test to be applied to a pigment is not whether it possesses *all* the desirable qualities. If it were, the statutory pigments would have to be condemned first of all. The test to be applied is rather, whether a pigment possesses some of the im-

portant qualities above mentioned and is capable, if used in proper proportions, to give to paint important, useful qualities.

The defense has introduced a large amount of testimony tending to show that several of the class A pigments as found in the market are of variable composition. But the evidence shows that variability of composition is no objection to a pigment. It interests merely the manufacturer and does not affect the manufactured product. Moreover, if variability of composition were an objection, the statutory pigment, carbonate of lead, is open to it more than all other pigments.

Variability of composition is not an objectionable quality of a pigment from the standpoint of the user of paint. It presents merely a problem for the manufacturer.

Mr. Lane testified:

"Q. Assuming that all the ingredients of a chemical compound are valuable when used in mixed paints, is the variableness in composition an objection from the point of view of the manufacturer or of the user of the paint?

A. No, it isn't. He likes to know, though, as a matter of information for himself.

Q. That can be controlled, can it not, by making a specification of the composition which this material should contain?

A. Oh, yes, and is done.

Q. And you never have any difficulty in getting just what you specify?

A. No, sir.

Q. Whether that be zinc from western ores or whether it be zinc lead white, have you any difficulty?

A. No, sir.

* * * * *

Q. But the most that could be said would be that the variableness in composition might inconvenience the manufacturer, isn't that it?

A. That is it.

Q. Is there any objection on the score of variableness of composition from the standpoint of the user of the paint?

A. None whatever.

Q. Is there any objection on the score of variableness of the composition of a pigment from the standpoint of a person who would insist upon first-class quality of paint?

A. No, sir.

Q. Is it not true that you can make a first-class paint, no matter what the variation in composition may be, provided all the ingredients are valuable?

A. You can." (Trans., 406, 407; Rec., 703-705.)

Carbonate of lead, the statutory pigment, is the most variable in composition.

Professor Ladd testified:

"Q. I call your attention to a number of analyses of white leads, seven of them, given on page 42 of the third edition of Hurst's work entitled 'Painters' Colors, Oils and Varnishes,' published in London, 1901. You have a copy of that in your hand, have you, professor?

A. Yes, sir.

Q. The author there first gives the analyses by showing the contents of lead monoxide, carbonic acid and water, and thereupon states that from these said analyses the composition of the white leads analyzed by him can be calculated to be as follows, and then follow seven analyses showing the contents of lead carbonate and lead hydroxide; is that correct?

A. Yes, sir.

Q. Now, state whether I give correctly a quotation of the analyses thus reached by Mr.

Hurst: 'Lead carbonate, $PbCO_3$, 63.35, 72.15, 91.21, 71.93, 87.42, 68.36, 70.87; lead hydroxide, PbH_2O_2, 36.14, 27.68, 8.21, 27.88, 12.33, 31.64, 28.66.' Did I correctly state it?

A. You did.

Q. State whether or not, on the same page, just before the statement of the analyses of white leads, the author uses the following language: 'It is scarcely necessary to point out that as white lead is made by many processes, it must necessarily vary in composition; indeed, the white lead yields by the same process do not always have the same composition, as is evidenced by the analyses given here and on page 20; these have been collected from a variety of sources.' Have I correctly quoted?

A. Yes, sir." (Trans., 252; Rec., 442.)

NOTE.—In the following statement of the qualities of the various pigments, we shall present in conspicuous type the facts established by the evidence. Comments, where deemed necessary for the proper understanding of the evidence, will be printed in ordinary type. Instead of contenting ourselves with mere references to the pages of the record in support of each point, we will for the convenience of the court append in the appropriate places in indented solid lines, quotations of the evidence relied upon, together with references to the pages of the record.

C. The Qualities of the Statutory Pigments.

(1) THE QUALITIES OF CARBONATE OF LEAD.

NOTE.—By a tacit understanding between the counsel conducting the examination of the witnesses "pure" carbonate of lead (specified in the statute) was not referred to, as it is conceded to be totally unfit for use in paint. (Par. 22 of bill, admitted by demurrer.) All the witnesses and counsel in speaking of carbonate of lead refer to "commercial" carbonate of lead. This article is frequently referred to by its colloquial synonym of "white lead."

Merits of Carbonate of Lead.

We concede that carbonate of lead has the following desirable qualities:

(a) Great opacity.

(b) Good initial whiteness.

(c) Very good working under the brush. (This concession is made only as to the globular variety, but not as to the crystalline variety of carbonate of lead.)

Defects of Carbonate of Lead.

(a) Carbonate of lead lacks durability. It is an easily decomposable chemical body. It combines with elements of linseed oil. This combination decomposes both the linseed oil and the carbonate of lead. Rain, moisture and other atmospheric influences decompose it. This produces what is called chalking or flouring of the paint.

Doctor Dudley testified:

> "White lead is an easily decomposable body, not stable. Mixed with linseed oil, apparently chemical reaction takes place which results in a rapid perishing of the paint, well known as powdering or flouring." (Trans., 77; Rec., 114.)
>
> "Paint, as we understand it, is a mixture of finely divided matter with, for the purposes, linseed oil. * * * If the finely divided matter is of such a nature that it can, by chemical change, combine with the linseed oil, usually in our experience a product is formed that is not as durable and valuable as though the finely divided matter which we commonly call pigment

was absolutely inert to linseed oil. Now, the first basis for a complaint against the statutory pigments is that they easily result in such chemical reaction with constituents of the oil." (Trans., 77; Rec., 115, 116.)

"In our experience, water is the element most destructive to paints. That we get constantly from the rainfall.

Q. Has that a decomposing influence upon carbonate of lead?

A. We assume so because we find the white lead paint layer decomposed and assume that it is the water largely that does it.

Q. But whatever it may be, whether it is water or the moisture in the air or some other quality of air, is it true that you notice that carbonate of lead becomes decomposed when it is exposed to the influence of weather or atmospheric conditions apart from the influence of sulphur gas?

A. I think I am perfectly safe in saying yes." (Trans., 101; Rec., 161, 162.)

Mr. Toch testified:

"Carbonate of lead, commonly known as white lead, is a rather unstable pigment. * * * When exposed it blackens readily and decomposes." (Trans., 113; Rec., 185.)

"There is an aptitude for white lead carbonate to combine with linseed oil.

* * * * *

Q. Now, state whether or not this chemical combination * * * works a decomposition of these elements?

A. It does.

* * * * *

Q. Is this decomposition hurtful to the linseed oil?

A. It is.

Q. And is it hurtful to the carbonate of lead? * * *

A. It is.

Q. What particular useful quality or quali-

ties of mixed paint does this chemical affinity impair?

A. It impairs what is known as the life of the paint.

Q. You mean it impairs the durability of the paint?

A. Durability, yes, sir." (Trans., 113, 114; Rec., 186.)

"Q. So far as the physical contact with floor paint is concerned, are carbonate of lead (and oxide of zinc) as pigments for floor paint especially susceptible to that influence, to the influence of physical contact?

A. They are.

Q. And are they or are they not susceptible to the influence of moisture when the surface is cleaned, scrubbed?

A. They are; they are more susceptible to moisture than any other pigments in either Class A or Class B." (Trans., 125; Rec., 206.)

Mr. Lane testified:

"I regard it (carbonate of lead) as a more or less valuable pigment. It has many shortcomings: for exposed work it perishes very rapidly; * * * for floor paints or paints coming in contact, it is very rapidly destroyed, very quickly destroyed.

Q. You mean where the surface is subject to strong physical contact?

A. Yes, sir, that is what I mean." (Trans., 153; Rec., 258.)

Professor Ladd testified:

"Q. How about the effect upon the carbonate of lead of the lead linoleate?

A. The remaining portion gradually reacts upon, that is, the lead carbonate upon the linseed oil, and forms a product which is decomposed in the paint when it is exposed to the surface, on the surface.

Q. Well, what makes it so?

A. From the gradual chemical change or the

union which takes place between the two, and the action of the atmosphere upon it.

Q. Now, does not that result in chalking?

A. That results in the wearing away and the chalking of the surface." (Trans., 239, 240; Rec., 418, 419.)

"Q. Does not Mr. Hooker, at the bottom of page 39 and the beginning of page 40, say, after speaking of the claims of a certain manufacturer of corroded lead, the following: 'While the views expressed by this manufacturer may be well taken, after all it is rather begging the question, since *with the best of lead and oil, chalking will take place.* This is due, without question, to the well known fact that white lead promotes the slow oxidation or drying of the oil and the ultimate product of this oxidation is *a dry powder without life or elasticity.* Lead hastens this end of completed drying much more rapidly than any other pigment, and so, unless some means is used to retard the action, the oil perishes and the dry lead alone is left to wash or chalk off.'

A. That is what takes place in the course of time." (Trans., 290; Rec., 507.)

Mr. Joystad testified:

"Q. But I have asked you about carbonate of lead as the only pigment?

A. Well, then it wouldn't give satisfaction. * * *

Q. Does it not also have a tendency to * * * chalk and flour?

A. That is true (Trans., 314; Rec., 547).

Q. Now, when paint chalks or flours, that means that particles of it will drop off; isn't that so?

A. Yes, sir." (Trans., 314; Rec., 548.)

Mr. Cook testified:

"Well, it (oxide of zinc) partly helps hold the lead (carbonate of lead) up, and it partly overcomes it chalking, the lead chalking." (Trans., 337; Rec., 587.)

Professor Ladd's "expert" opinion that the chemical combination between carbonate of lead and linseed oil produces elasticity or toughness of the paint and thereby increases its durability, is admittedly pure theorizing.

Professor Ladd testified:

"Q. Now, then, the fact that this elasticity or toughness of the paint produced by the chemical combination between carbonate of lead and linseed oil adds to the durability of the paint, is not something that you can speak of from your personal observation or your personal tests or examinations?

A. I have made no practical tests that have been extended over a time to test this feature, no, sir.

Q. It is, then, purely theorizing on your part, is it not?

A. Theorizing and chemical.

Q. Theorizing on the basis of your chemical knowledge?

A. Yes, sir." (Trans., 289; Rec., 505, 506.)

(b) Carbonate of lead lacks permanence of color. It turns yellow and, when exposed to the influence of gases, particularly sulphur gases, tends to turn black.

Doctor Dudley testified:

"Also the pigment (carbonate of lead) is readily acted upon by the gases arising from the burning of coal, or in the air from sewers, and is discolored thereby. * * * From some cause, probably the presence of finely uncorroded metallic lead, a surface painted with white lead becomes yellowish." (Trans., 77; Rec., 115.)

Mr. Toch testified:

"If it is subjected to the action of gases, particularly sulphur gases, and when exposed it blackens readily." (Trans., 113; Rec., 185.)

Mr. Lane testified:

"For interior work it turns yellow, changes its color." (Trans., 153; Rec., 258.)

Professor Ladd testified:

"Q. How about the effect of the presence of sulphur gas in the air upon carbonate of lead?

A. It tends to darken, the combination of the sulphur compounds with the lead.

Q. What brings that about?

A. From the action of the sulphur upon the lead, forming a sulphur compound with the lead." (Trans., 240; Rec., 420.)

Mr. Joystad testified:

"Q. I will ask you whether carbonate of lead alone, used in mixed paint, will not blacken when exposed to the influences of sulphur gases?

A. Well, I don't know if anybody turns out any strictly pure carbonate of lead in mixed paint. * * *

Q. You can't make mixed paint out of 100% of carbonate of lead. can you, and have good results?

A. No, sir.

Q. Why not?

A. Well, just because of the very question you set here before me.

Q. On account of its blackening tendency?

A. Yes, sir." (Trans., 313; Rec., 547.)

"Q. But I have asked you about carbonate of lead as the only pigment?

A. Well, then it wouldn't give satisfaction.

Q. Now, the first reason why it wouldn't give satisfaction is that it has a tendency to blacken?

A. Yes, sir." (Trans., 314; Rec., 547.)

Professor Ladd's Bulletin says:

"It (referring to sublimed lead) differs from the ordinary white lead in being non-poisonous and resists the *blackening* action of the sulphur compounds of sewer gas, and of fuel gases to a much greater degree." (Trans., 52; Rec., 82.)

(c) Carbonate of lead leaves a bad surface for repainting.

Dr. Dudley testified:

"With white lead, the usual condition of the surface on exposure * * * is that it becomes porous and easily detachable. On painting over this, a large part of the vehicle used in the paint goes in the porous layer, making it difficult to get an even surface in repainting." (Trans., 79; Rec., 119.)

Mr. Toch testified:

"Carbonate of lead presents a filmy, absorbent and chalky surface on which it is very difficult and unadvisable to repaint." (Trans., 124; Rec., 205.)

Mr. Lane testified:

"It chalks or rubs off and presents a very spongy or porous surface and, in repainting, the first coat that is applied after a reasonable term of years is practically absorbed or taken up by it; you might say, lost.

Q. So that you do not regard the surface left from a paint containing carbonate of lead as favorable for repainting, do you?

A. No, sir." (Trans., 153, 154; Rec., 259.)

(d) Carbonate of lead lacks the quality of keeping in suspension in the vehicle; it settles and hardens badly in the can.

Doctor Dudley testified:

"Q. What are the qualities of the statutory pigments if they alone are used in mixed paint, with reference to this subject (settling in the can)?

A. Our experience is that they settle badly." (Trans., 85; Rec., 130.)

Mr. Toch testified:

"Q. Have you ever come across mixed paint wherein practically the sole pigment was carbonate of lead?

A. Yes, sir.

Q. What did you find there?

A. I made a sample of pure Atlantic White Lead, thinned with the correct proportion of linseed oil and pale turpentine Japan, and we found that within twenty-four hours it had settled relatively hard on the bottom of the can.

Q. Could a mixed paint be put out wherein the pigment practically was carbonate of lead and nothing else?

A. No, sir.

* * * * *

Q. Does the National Lead Company put out any such mixed paint?

A. No, sir.

Q. Do you know the reason why it does not?

A. It would not be salable if it remained on a man's shelf as long as the other paint remains.

Q. What would happen?

A. It would settle hard, and it would be difficult to break up." (Trans., 365; Rec., 634, 635.)

Mr. Lane testified:

"Carbonate of lead alone is one of the great

offenders in the line of settling." (Trans., 165; Rec., 280.)

"Q. Compare the tendency of sublimed white lead to harden in the can with the tendency of carbonate of lead to harden in the can?

A. Well, it is very difficult to compare them because I have never seen any settling from sublimed lead and I have always had it in the carbonate of lead, having in mind a sample of pure carbonate of lead that I had mixed up just twenty-four hours previous to the time of examination, and found quite a heavy precipitate at that time. Therefore, I consider that comparisons are odious." (Trans., 404; Rec., 701.)

Professor Ladd testified:

"Q. Does not carbonate of lead have a tendency, if used alone, in mixed paint, to harden in the can, and to settle at the bottom?

A. I think it has a tendency to settle at the bottom, yes, sir.

Q. Has it not a tendency to harden, to leave the vehicle, to settle, to separate from the thinner?

A. It settles, yes, sir." (Trans., 243; Rec., 425.)

(e) Carbonate of lead is unfit for use in combination with coloring matter containing sulphurous substances and unfit for use in combination with resinous varnishes.

We are confident that our contention under this head will not be disputed. There is ample evidence for it and none against it. It will not be disputed that ultamarine blue, Prussian blue and chrome green are necessary coloring materials for the production of certain shades. Nor will it be disputed that they contain sulphurous substances. Nor will

it be disputed that carbonate of lead cannot be used in connection with these sulphurous substances in paint, because such combination would result in chemical reaction, discoloration and decomposition.

As a sample, however, we quote from the testimony of the chief witness for the defense, who says that:

Class A and Class B pigments should be used where ultra-marine is the coloring matter.

Professor Ladd testified:

"Q. You say you subscribed to the statement of Professor Hurst, that carbonate of lead and ultra-marine cannot be used together?

A. I said that was probably true.

* * * * *

Q. And that results from the fact that ultra-marine contains what element?

A. The sulphur.

Q. What is the effect of the combination?

A. To form a sulphide with the lead.

Q. What is the effect of that upon the color?

A. It would change the color.

* * * * *

Q. From your knowledge of the properties of oxide of zinc alone, in connection with ultra-marine as a coloring matter, could you obtain a satisfactory paint?

A. Probably not entirely satisfactory.

Q. Then, in order to give the proper body and other qualities which mixed paint should have, it would be necessary to add some other pigment?

A. It would.

Q. And one that would not combine with the sulphur of the ultra-marine?

A. Such would be the case.

Q. What pigment would you then use in that case?

A. I don't know which would be the most satisfactory.

Q. But one or another of the Class A pigments, or possibly a combination of the Class A and B pigments?

A. Class A and B pigments, yes, sir." (Trans., 279, 280; Rec., 489, 490.)

Nor will it be disputed that carbonate of lead is unfit for use in combination with resinous varnishes. Nor can it be disputed that varnish is an essential element in paint which is intended to have a high gloss finish, or in paint which is intended to be especially impervious to the influence of moisture, because the demurrer admits the allegations to this effect in the bill (Paragraph 20). We will, therefore, cite no references from the evidence to substantiate our contentions under this head.

Nor is it necessary, in view of Paragraph 3 of the answer of the defendant, to cite evidence for the proposition that in a large number of shades composing about 25% of all the mixed paints sold and consumed in North Dakota, carbonate of lead cannot be used by reason of its color modifying power.

(f) In addition to having the foregoing objectionable qualities, the crystalline variety of carbonate of lead is otherwise objectionable.

Professor Ladd testified:

"Q. Now, there are two general classes of white lead, so far as its physical condition is concerned, are there not, one being the globular and the other being the crystalline?

A. Yes, sir.

Q. They are very different, are they not, in their action?

A. They seem to be, yes, sir.

Q. Both, however, are known as carbonate of lead?

A. Yes, sir.

Q. Now, globular white lead is good white lead, is it not?

A. It is so recognized, yes, sir.

Q. And the crystalline are the poorer in comparison?

A. The more objectionable one, yes, sir.

Q. Is it not decidedly objectionable?

A. Yes, sir." (Trans., 254; Rec., 446.)

(g) Carbonate of lead is a deadly poison. It is the only poisonous white pigment. In France, after many years of agitation, the protest against its use as a material for industrial painting has assumed shape in a bill to suppress its manufacture adopted by the Chamber of Deputies. In Germany stringent regulations have been adopted tending to decrease the danger of lead poisoning to workmen handling carbonate of lead and paints containing the same.

(Trans., 256-8; Rec., 449-452.)

(2) The Qualities of Oxide of Zinc.

Note: This article is frequently referred to by its colloquial synonym of "zinc white."

The Merits of Oxide of Zinc.

We concede that oxide of zinc has the following desirable qualities:

(a) Splendid initial whiteness.

(b) Permanence of color.

(c) Little tendency to settle in the can.

(d) Tolerably good working under the brush.

Defects of Oxide of Zinc.

(a) Oxide of zinc lacks durability. It is an easily decomposable chemical body. It tends to combine with constituents of the oil. It does not stand well outside exposure. Rain and moisture disintegrate it. It dries hard and brittle, which results in "cracking" and "peeling" of the paint.

Doctor Dudley testified:

"White lead and zinc white are distinctly inferior pigments." (Trans., 77; Rec., 114.)

"Zinc white apparently combines likewise with linseed oil when applied as a paint, forming a layer which has a great tendency to crack and peel off, and also does not stand well outside exposure." (Trans., 77; Rec., 115.)

"The statutory pigments, in accordance with our studies, are inherently defective and bad." (Trans., 77; Rec., 116.)

"The first basis for a complaint against the statutory pigments is that they easily result in chemical reaction with constituents of the oil." (Trans., 77; Rec., 116.)

"A combination of linseed oil with the statutory pigments that has had the necessary treat-

ment with water and cleaning, such as is necessary with floor paint, would be more porous and more inclined to go to pieces, as we would say, than the former." (Referring to a combination of pigments in which a Class B pigment forms an element.) (Trans., 85; Rec., 131.)

Mr. Toch testified:

"Atmospheric influence is felt by chemical compounds which are incomplete. By that I will say that oxide of zinc very readily combines with any other element, and, while you cannot see it combine with sulphur, it nevertheless does so. It dries, through various influences of moisture and sunlight, so that it becomes eventually very hard and brittle.

Q. And the effect of that brittleness is?

A. To chalk, to crack and dislodge itself or peel." (Trans., 113; Rec., 185.)

"Q. What particular useful quality or qualities of mixed paint does this chemical affinity impair?

A. It impairs what is known as the life of the paint.

Q. You mean it impairs the durability of the paint?

A. Durability, yes, sir." (Trans., 114; Rec., 186.)

"Well, an oxide of zinc paint pure is known not to withstand water but to be decomposed by water.

* * * * *

Q. How about a mixed paint which has other pigments in addition to oxide of zinc; is there any effect of the water or moisture upon the oxide of zinc in the mixed paint?

A. An effect which is deleterious." (Trans., 114; Rec., 187.)

"Q. So far as the physical contact with floor paint is concerned, are (carbonate of lead and) oxide of zinc as pigments for floor paint

susceptible to that influence, to the influence of physical contact?

A. They are.

Q. And are they or are they not susceptible to the influence of moisture when the surface has been cleaned, scrubbed?

A. They are; they are more susceptible to moisture than any other pigments in either Class A or Class B." (Trans., 125; Rec., 206.)

Mr. Lane testified:

"It does not withstand the action of water. It dries very brittle and hard, cracks, chips and peels." (Trans., 153; Rec., 259.)

Professor Ladd testified:

"Zinc (referring to oxide of zinc) forms a hard covering that is more liable to crack.

Q. Crack and peel?

A. Yes, sir." (Trans., 240; Rec., 419.)

Mr. Joystad testified:

"Q. Now, if you use oxide of zinc alone, will that give a good paint?

A. No, sir.

Q. What is the matter with it?

A. It dries too hard.

Q. What happens?

A. Cracks.

Q. And peels?

A. Yes.

Q. Now, when paint chalks or flours, that means that particles of it will drop off; isn't that so?

A. Yes, sir.

Q. And when it cracks and peels the same result will follow?

A. The same result will follow." (Trans., 314; Rec., 548.)

(b) Oxide of zinc is deficient in opacity.

Professor Ladd testified:

"Q. So, to judge from that, zinc white has the objection that it does not work well under the brush, has it not?

A. Yes, sir.

Q. And it wants body?

A. It wants body, yes, sir." (Trans., 255; Rec., 448.)

Professor Ladd's Bulletin says:

"The chief fault with zinc white is its want of body, *i. e.*, hiding the surface over which it is spread, which is not equal to that of white lead." (Trans., 53; Rec., 83.)

Mr. Cook testified:

"Zinc alone, of course, hasn't the hiding power that lead has. * * *

"It don't have the opacity or it doesn't hide blemishes as well as the lead will." (Trans., 337; Rec., 587.)

(c) Oxide of zinc leaves a bad surface for repainting.

Doctor Dudley testified:

"With zinc white the tendency to crack and peel as well, leaves a bad surface." (Trans., 79; Rec., 119.)

Mr. Toch testified:

"Zinc oxide presents a hard and in some cases vitreous and cracked surface which is uneven and very difficult to remove." (Trans., 124; Rec., 205.)

Mr. Lane testified:

"It dries very brittle and hard, cracks, chips and peels; besides it presents a surface, after

being on a few years, that is almost impossible to repaint, owing to the fact of its drying so brittle and so hard. The following coats will not adhere to it or fasten themselves to that material." (Trans., 153; Rec., 259.)

3.—The Qualities of Combinations of the Two Statutory Pigments.

Note: We have heretofore pointed out that the statute sanctions, and exempts from the requirement of labelling, a paint containing either of the statutory pigments as the sole white pigment. The statute, however, *permits* that the two statutory pigments be used in combination. There may, of course, be an innumerable variety of such combinations, ranging from a fractional per cent. of carbonate of lead with more than 99% of oxide of zinc, to more than 99% of carbonate of lead with a fractional per cent. of oxide of zinc. Let us assume, however, a combination in such proportions as will produce the best results attainable.

We concede that such combination in proper proportions has sufficient opacity; that the tendency of carbonate of lead to discolor is largely diminished by the permanence of color of oxide of zinc; that the combination remains better in suspension in the can. But such combination by reason of its coloring power is unfit for use in many shades of paint. Nor can it be used in combination with coloring matter containing sulphurous substances, because the latter would chemically combine with the carbonate of lead. Moreover, the

combination lacks durability, is easily decomposed and leaves an unsatisfactory surface for repainting.

Doctor Dudley testified:

"Q. Now, then, speaking of the combination between the two, is the combination still subject, though in lessened degree, to the defects which you have spoken of?

A. I do not have in mind any specific case, but I should say yes, to a greater or less extent." (Trans., 78; Rec., 117.)

Mr. Toch testified:

"Q. Are those deleterious effects (referring to the effects of exposure and to the chemical combination with linseed oil) present in the same or in a lesser degree, where those two statutory pigments are combined?

A. Naturally in a lesser degree.

Q. In a lesser degree, but do they exist?

A. They do exist." (Trans., 114; Rec., 187, 188.)

Mr. Lane testified:

"Well, it is an improvement over the single pigment, a step in the right direction, but I do not consider it a complete paint, because the combination has the weakness of both pigments.

Q. How about the action of rain or moisture on this combination?

A. It destroys it, destroys the film and the material disintegrates. A combination of that kind is destroyed without rain.

* * * * *

Q. Within what time would you notice the decomposing effect of exposure to atmospheric conditions upon a combination of carbonate of lead and oxide of zinc?

A. Well, to me who is used to examining samples, I notice an effect in thirty days.

* * * * *

Q. Within what time would you notice that this influence was strong enough to really destroy the usefulness of the coat of paint?

A. Well, if you mean that the surface really required and should be repainted, my best combination of those two pigments, three years." (Trans., 154; Rec., 260, 261.)

Mr. Joystad testified:

"Q. Now, even in a combination of carbonate of lead and oxide of zinc, isn't there, in a lesser degree, a tendency to crack and peel and chalk, after a few years?

A. No; if it peels it can't chalk.

Q. Well, what does it do then, doesn't it do any of these things?

A. Well, it will do one or the other.

Q. That will depend upon whether more carbonate of lead is put in, or more oxide of zinc is put in, isn't that right?

A. Yes, sir." (Trans., 314; Rec., 548.)

The defects of the statutory pigments cannot be entirely overcome. They must either be abandoned or used in combination with other pigments not subject to the same defects.

Doctor Dudley testified:

"A. I know of no method by which the defects of the statutory pigments may be absolutely overcome. Their defects may be diminished or minimized in two or three ways; first, abandoning them entirely and using others; second. mixing with the statutory pigments other pigments which do not have the defects mentioned and thus obtain a paint layer which will be less subject to the defects that have been already stated." (Trans., 77, 78; Rec., 116.)

D. The Qualities of Class A Pigments.

1.—The Qualities of Sublimed Lead.

Note: The terms "sublimed lead" and "sublimed white lead" are synonymous and are used by the witnesses interchangeably.

The term "body" is used by witnesses as meaning opacity or hiding power. (See Ladd's Bulletin, Trans., 57; Rec., 88.)

Sublimed lead has every desirable quality of an ideal pigment. Differing in this respect from the statutory pigments, it is capable, even if used as the only pigment, to give to paint all the desirable qualities which a white pigment should, except that by reason of its color modifying power it is unfit for use in certain shades of paint where the statutory pigments are likewise unfit for use. It possesses the following qualities:

1. **Great durability.**
2. **Great opacity.**
3. **Leaving a surface suitable for repainting.**
4. **Splendid initial whiteness.**
5. **Permanence of color.**
6. **Good working under the brush.**
7. **Suspension in the can.**

Professor Ladd's Bulletin says (Trans., 52; Rec., 82):

> "It exceeds in the fineness of the particles the ordinary grades of white lead and is at least

equal to them in whiteness, body, covering power and wearing qualities. It differs from the ordinary white leads in being non-poisonous and resists the blackening action of the sulphur compounds of sewer gas and of fuel gases to a much greater degree."

This statement is emphatically endorsed by:

Doctor Dudley: Trans., 82, 83; Rec., 126.

Mr. Toch: Trans., 116; Rec., 191.

Mr. Lane: Trans., 156, 157, 158.

NOTE: In speaking of "*the fineness of the particles,*" Professor Ladd refers to a *valuable quality* of a pigment. (See Mr. Lane's testimony, Trans., 161; Rec., 272; testimony of Mr. Toch, Trans., 372; Rec., 647.)

The testimony does not directly refer to the quality of sublimed lead as regards *leaving a surface suitable for repainting.* The defect of carbonate of lead and oxide of zinc in this regard arises as hereinabove shown, from the fact that one chalks and flours, and the other cracks and peels. Sublimed lead has not been shown to be subject to such or similar forms of disintegration. It must, therefore, be concluded that it has the quality of leaving a surface suitable for repainting.

Sublimed lead neither hardens nor settles in the can.

As to the quality of the suspension of the solid matter in the can, Professor Ladd testified that he is informed that sublimed lead has a greater tendency to settle or harden in the can than carbonate of lead. (Trans., 258; Rec., 453.) He does not state what his source of information is, and frankly ad-

mits that he has made no tests which would enable him to speak on the subject from his own knowledge. He also admits that the tendency to settle may, in the case of sublimed lead, be overcome just as it can be overcome, by the addition of other pigments, in the case of carbonate of lead. (Trans., 258; Rec., 453.)

Mr. Toch and Mr. Lane, however, speak on the subject as the result of practical tests and investigations. Both emphatically deny that sublimed lead has any such tendency.

Mr. Toch testified:

> "I have found that sublimed lead has absolutely a negative quality as regards hardening in the can. It remains much softer and it remains softer for a much longer time than carbonate of lead. The tendency of carbonate of lead is decidedly to harden in the package." (Trans., 364; Rec., 633.)

Speaking of an apparently old can of mixed paint in which sublimed lead was the only white pigment and which was especially tested by Mr. Toch, he says:

> "When the can was opened, we inserted the spatula and allowed it to sink slowly to the bottom, and we found that it was perfectly soft to the bottom of the can and it stirred up very readily, and of all the samples I received, it impressed me most favorably.
>
> Q. Had the can been standing in your own laboratory long enough for the pigment to have hardened or settled?
>
> A. Not to be hardened, but it could have settled because it was standing a week or more.
>
> Q. Before you opened it?
>
> A. Before we opened it.

Q. Had it settled?
A. Not to any appreciable extent." (Trans., 365; Rec., 634.)

Mr. Lane testified that he had had ocasion to examine thousands of cans of mixed paint containing sublimed white lead, after the cans had been opened. He then says:

"Q. Did you ever notice that the presence of sublimed white lead in mixed paint caused a tendency of the pigment to harden in the can?
A. No, sir, never." (Trans., 403; Rec., 699.)

Mr. Lane further testified that he had recently made a test with a five-year-old can of mixed paint, containing 42% of sublimed lead, and found it in excellent condition. He says:

"It stirred up readily and at once, and was ready for application without the addition of any thinner or any pigment." (Trans., 403, 404; Rec., 699, 700.)

Sublimed Lead Works Smoothly Under the Brush.

Some criticisms of the working qualities of sublimed lead were made by two of the defendant's witnesses.

Professor Ladd admitted that his criticism in this regard was based purely upon hearsay. He could name but two persons who had given him the information. He admitted that the information might have been not only second-hand but third-hand information. (Trans., 258, 259; Rec., 453, 454.)

Mr. Joystad told of having made an experimental sample of paint wherein he used sublimed lead in

combination with carbonate of lead and oxide of zinc, or both, and that the paint did not work well under the brush. (Trans., 311 to 313.)

To meet this criticism as well as the objection that it settled or hardened which were raised by witnesses for the defendant, we caused 78 of the leading paint manufacturers of the United States to send to Mr. Toch's laboratory in New York samples of mixed paint manufactured by them respectively, containing sublimed lead. These samples were not of an experimental nature, but were taken from the various manufacturers' stocks on hand.

As the time within which our rebuttal evidence had to be closed was exceedingly limited (Trans., 73; Rec., 106), the time was too short to analyze all the samples sent and likewise too short to permit brushing tests to be made of more than 15 samples. In these tests Mr. Toch had the constant assistance of Mr. Lane. Mr. Toch and Mr. Lane, in their testimony in rebuttal, fully described how the tests were made, so as to show the absolute fairness of the conditions. The samples with which brushing tests were made were taken at random. All contained large though varying percentages of sublimed lead. Both Mr. Toch and Mr. Lane testified that all of these paints had excellent working qualities, flowing freely and smoothly from the brush. (Trans., 377-383; Trans., 411, 412.)

The charge that sublimed lead is variable in composition is based upon nothing else than the analyses of two samples of sublimed lead made prior to 1892. (Trans., 131; Rec., 217-8; Trans., 159; Rec., 268-9.)

Most likely one of the samples was American, the other English sublimed lead, which are very different. (Trans., 192; Rec., 327.)

Sublimed lead has been practically uniform in composition for many years last past. (Trans., 157; Rec., 265-6; Trans., 201; Rec., 342-3.)

From the standpoint of efficiency of the paint, sublimed lead may with distinct advantage be substituted altogether for carbonate of lead.

Mr. Toch testified:

"Q. Would you regard a combination of sublimed lead with carbonate of lead and oxide of zinc in some proportions as better than a combination of only the statutory pigments in mixed paint?

A. I certainly would.

* * * * *

Prior to the time when we had sublimed white lead, for certain purposes we only had carbonate of lead and oxide of zinc, is that right?

A. Yes.

Q. Now that you have sublimed white lead, would you, in all such cases, consider that it would be proper to use sublimed lead in part for these statutory pigments?

A. Certainly I would.

Q. You have thus far answered that the substitution of sublimed lead is proper in part. Up to what extent would you consider the substitution proper? I don't mean from the commercial point of view, but from the point of view of the usefulness and efficiency of the paint?

A. The more we would put into the mixed paint containing the statutory pigments, the better the paint would be.

Q. The more sublimed lead you would put in?

A. The more sublimed lead you would put in, the better the paint would be.

Q. Now, can you substitute sublimed white lead for oxide of zinc?

A. You cannot.

Q. But can you substitute it altogether for carbonate of lead?

A. You can.

Q. And in your opinion with distinct advantage?

A. With distinct advantage.

Q. State whether or not any mixed paint made of sublimed white lead and oxide of zinc would be superior to a mixed paint made of carbonate of lead and oxide of zinc?

A. It would.

Q. Other things being equal?

A. All other things being equal." (Trans., 117, 118; Rec., 193-195.)

Sublimed lead is the best opaque white pigment in the American market.

Mr. Lane testified:

"Sublimed lead was first brought to my attention in the fall of '93, or shortly after I accepted my position with the McLennan Paint Company; up to that time I hadn't seen it. I included it with the rest of the pigments in my general tests which I have already described, when I first wanted to make myself familiar with the white pigments of the American market, and I continued experimenting. We were not then manufacturing mixed paint. But in 1894, I think it was in March, '94, we started to use sublimed white lead in our general business, continuing our experimenting with that material. When we were ready to put our mixed paint on the market we selected that as being the best white pigment in the American market, as far as we had been able to locate, of all the pigments we could find, and adopted that

as our pigment under which we were going to build or make our business on mixed paint, starting out from that time and continuing to use it up to the time I left the McLennan Paint Company.

Q. In so determining, Mr. Lane, did either you or your employers, as far as you know, determine upon sublimed white lead instead of another opaque white pigment because of its being cheaper or, if not for that reason, then for which reason?

A. For the reason that we made the most durable paint by the use of sublimed white lead, and no other reason.

Q. Did the question of cost at all influence you?

A. It had no bearing on the subject whatever, for the reason that the McLennan Paint Company was a new house, had no mixed paint business, and this country was crowded with large and well known mixed paint houses, and we had to get a reputation to get in business.

Q. A reputation for what?

A. For good paint.

Q. What was the result of the use of sublimed white lead so far as the extension of your mixed paint business was concerned?

A. Well, from a mixed paint business of nothing we went to $137,000 in eight years, and at no time had more than seven traveling men introducing the goods.

Q. Was the growth sudden or gradual?

A. It was gradual." (Trans., 155, 156; Rec., 262-264.)

Sublimed lead is very extensively used in mixed paint.

Mr. Toch testified:

"Q. Do you know whether sublimed white lead is nowadays considerably used in mixed paint?

A. I know that it is very extensively used.
Q. In shades as well as whites?
A. Well, in mixed paints would imply all shades." (Trans., 119; Rec., 195.)

In the New York market the price of sublimed lead is about the same as that of carbonate of lead.

Mr. Toch testified:

"Q. Professor Ladd spoke of the market price of sublimed white lead and compared it with the market price of carbonate of lead basing his testimony upon figures purporting to be contained in certain trade journals. Have you actually purchased sublimed white lead in commercial quantities?
A. Yes, sir.
Q. For how long have you been doing that?
A. The last I purchased was the latter part of January.
Q. What year?
A. This year.
* * * * *
Q. How did the market price of sublimed white lead and of carbonate of lead compare generally during the year 1905?
A. Carbonate of lead, dry, was about the same price as sublimed white lead.
Q. In the New York market?
A. In the New York market." (Trans., 366; Rec., 635, 636.)

In the West carbonate of lead is a quarter of one cent dearer than sublimed lead. Sublimed lead is three-quarters of a cent dearer than oxide of zinc.

Mr. Lane testified:

"Q. You were asked something about the cost of sublimed white lead as compared to the cost of the statutory pigments and you said that the cost of sublimed white lead was not much less than the cost of carbonate of lead, but we have yet to hear as to what that difference is. Will you tell us?

A. My last purchases, there was a quarter of a cent per pound difference.

Q. Which was the costlier?

A. Lead carbonate.

Q. Now compare the cost of sublimed lead to the cost of oxide of zinc?

A. Sublimed lead is higher priced.

Q. What is the difference in price?

A. From one-half to three-quarters of a cent." (Trans., 116; Rec., 333.)

The difference in price, irrespective of freight, between carbonate of lead and sublimed lead is due to the fact that carbonate of lead is controlled by a trust: the National Lead Company.

Mr. Toch testified:

"Q. Can you state why carbonate of lead is higher priced than sublimed lead, irrespective of the question of freight now?

A. Oh, I should say it was due to the fact that it is controlled by the trust.

Q. Which is controlled by a trust?

A. Carbonate of lead.

Q. What company controls that?

A. National Lead Company." (Trans., 125, 126; Rec., 207.)

(2) The Qualities of Zinc Lead White.

Zinc lead white is an intimate combination of lead sulphate and zinc oxide. Physically it resembles a high grade oxide of zinc. Its opacity is greater than that of oxide of zinc and more nearly that of carbonate of lead. It is more inert than carbonate of lead, which means it is more durable. In proportion to the lead it contains, it is as good as sublimed white lead.

Prof. Ladd's Bulletin says (Trans., 53; Rec., 83, 84):

> "As prepared, it is apparently a molecular combination of zinc oxide, lead sulphate and small proportions of lead carbonate and oxide. The combination, if it may be so termed, being effected at a high temperature while the metals are in the form of vapor, the union is far more intimate than could be obtained by grinding together the separate component pigments.
>
> In physical appearance the zinc lead whites closely resemble a good grade of zinc oxide, but their specific gravity is higher and their density greater. This difference becomes more noticeable on grinding with oil, the proportion of oil taken up being much nearer to the figure for Dutch process white lead than to that for zinc oxide. The density or obscuring power of the resultant paint places it in the lead rather than in the zinc class."

Mr. Toch testified:

> "Q. Now, as to zinc lead white, what is your opinion as to the value of this pigment?
>
> A. Is this the Canon City White that you refer to?
>
> Q. Yes.

A. That is a very valuable pigment and in proportion or in ratio to the lead that it contains is as good as sublimed white lead.

Q. Do I understand you to say that it is the presence of sulphate of lead in zinc lead white which gives it the virtue which you attribute to it?

A. The presence of oxy-sulphate of lead gives it the additional body, additional covering or hiding power, when used as a paint.

Q. Together with a higher degree of inertness than is possessed by carbonate of lead?

A. Correct, yes, sir." (Trans., 119; Rec., 195, 196.)

Zinc Lead white produces a paint better in appearance, more durable in substance and more permanent in color than a paint made from a combination of the statutory pigments alone. It works, if anything, better under the brush. Zinc Lead white is an ideal pigment where a combination of zinc and lead is wanted.

Mr. Lane testified:

"Q. Now, what is your conviction, based upon practical tests and experience, as to the value of zinc lead white, the Canon City product, as a white pigment?

A. I consider it a very valuable pigment and in paint where I want zinc in some proportion, or, in other words, a combination of lead and zinc, I consider it an ideal pigment.

Q. Compare it with any combination between the statutory pigments?

A. It is better.

Q. In what respects?

A. The finished product, finished paint, when first applied, presents a better appearance. It works, if anything, better under the

brush, and I have applied a lot of paint in my time and at periods ranging from one month to five years it has a better appearance all the time. I have no experience of a combination of the statutory pigments in a mixed paint as against zinc lead, the Canon City product, exposed on the surface side by side, under the same conditions longer than six years.

Q. Well, that will do, six years will do.

A. I have repainted any surface after that, but from the time of application up to six years it presented a better appearance and the work had a better protective coat. In other words, it was more pleasing to the eye and the surface was better protected where the zinc lead was used.

Q. When you say 'better protected,' do you mean better hidden, or do you mean something else?

A. I mean that and something else. I mean protection in the full sense of the word. There were no checks or cracks in the surface of the paint. It was better hidden or covered, if you like to put it that way, and therefore the surface beneath the paint had a better protective coat and it was more pleasing to the eye naturally, as there were no checks or cracks present. The color had remained in better condition; it was not discolored so much as a combination of carbonate of lead and oxide of zinc." (Trans., 161; Rec., 272, 273.)

Mr. Toch testified:

"Q. Is zinc lead white better than a combination of carbonate of lead and oxide of zinc?

A. Yes, sir." (Trans., 119; Rec., 196.)

As to the objections to zinc lead white.

NOTE: Prof. Ladd in his Bulletin states certain objections to zinc lead white as follows:

> "The chief objections made to it are that it is not always uniform in composition or in color. An average of a large number of analyses gives it the following average composition:
>
> | | |
> |---|---|
> | Lead sulphate | 48.10 |
> | Lead carbonate | 0.50 |
> | Lead oxide | 0.60 |
> | Zinc oxide | 50.50 |
> | Zinc sulphate | 0.30 |
>
> G. H. Ellis, however, reports some analyses of zinc lead whites carrying from 1.16 to 5.12 per cent. sulphate and considers this constituent in appreciable quantities as decidedly harmful."

In his testimony Prof. Ladd reiterates the same objections. (Trans., 219, 220; Rec., 278; Trans., 266; Rec., 467.)

Mr. Joystad objected to zinc lead white on the ground that its whiteness is not perfect or reliable and on the further ground that it is crystalline and some years after grinding resumes crystalline shape.

That none of these objections is well taken will now be shown.

Prof. Ladd's statement in his bulletin that "sulphate" in appreciable quantities is decidedly harmful refers to zinc sulphate and not to lead sulphate. (Prof. Ladd's testimony: Trans., 262; Rec., 460.)

The statement of G. H. Ellis referred to in the Bulletin is based on analyses of zinc lead white made prior to 1898. (Prof. Ladd's testimony: Trans., 262; Rec., 460.)

Prof. Ladd has no other authority for his statement than Ellis' book published in 1898. Nor has he ever analyzed zinc lead white himself. (Prof. Ladd's testimony: Trans., 297; Rec., 520, 521.)

There is zinc sulphate in small proportion in the statutory oxide of zinc. (Prof. Ladd's testimony: Trans., 262, 263; Rec., 461.)

The amount of zinc sulphate found in more than seven year's testing was no more than that found in the statutory oxide of zinc: less than one per cent.

Mr. Toch testified:

"Q. What have you found as to the presence of sulphate of zinc in zinc lead white in the samples that have come under your notice and analyses during the last *seven* years?

A. The percentage of soluble salts, which in almost all cases are zinc sulphate, always run under three-quarters of one per cent.

Q. Does the amount of zinc sulphate contained in zinc lead white, according to your experience for seven years, compare with the amount of zinc sulphate contained in New Jersey zinc oxide?

A. It is about the same." (Trans., 366, 367; Rec., 637.)

Mr. Lane testified:

"Q. Have tests been made under your supervision as to the amount of zinc sulphate contained in zinc lead white?

A. Yes, sir.
Q. Going back how long?
A. About *nine* years.
Q. How much of a percentage of zinc sulphate do you allow or are you willing to overlook as a negligible quantity in zinc lead white?
A. Up to one per cent.
Q. How many lots of zinc lead white have you found yourself under the necessity of rejecting by reason of their containing more than one per cent. of zinc sulphate?
A. Never rejected any.
Q. When you were with the McLennan Paint Company did you use New Jersey zinc?
A. Yes, sir.
Q. Large quantities, I suppose?
A. Very large quantities.
Q. Did you find that the New Jersey zinc carried a percentage of zinc sulphate?
A. Yes, sir.
Q. How does the percentage of zinc sulphate contained in the New Jersey zinc compare with the average amount of zinc sulphate which you find present in zinc lead white?
A. Practically the same." (Trans., 407; Rec., 705.)

Zinc lead white is no more variable in composition than any other commercial chemical product.

Mr. Toch testified:

"Q. Professor Ladd states in his testimony that zinc lead white is very variable in composition; is that your experience?
A. No, sir.
Q. What is your experience?
A. My experience has been that it will run as uniform as any commercial chemical product.
Q. What are variations that you found, if any?
A. They are within two per cent." (Trans., 366; Rec., 636, 637.)

Zinc lead white has been uniform in color in the last six or seven years.

Mr. Lane testified:

"Q. Have you found any lack of uniformity in the color of zinc lead white in your examination of that pigment?

A. Not in late years.

Q. When you say 'in late years,' what do you mean?

A. The last six or seven years." (Trans., 407; Rec., 705.)

Mr. Toch testified:

"Q. How about the uniformity or lack of uniformity in the color of zinc lead white?

A. I have always found zinc lead white to be of a uniform color within the last seven years." (Trans., 367; Rec., 637.)

If a sample of zinc lead white were not of perfect whiteness, this would be no objection except in case of white and light tints of paint.

Professor Ladd testified:

"Q. You do say in your bulletin on page 584 that there is an objection to zinc lead white because it is not always uniform in color. Suppose that a batch of zinc lead white were a little off color, were not as white as desirable in a white pigment, would there be any objection on the strength of the color if that zinc lead white were used in anything but a light shade of paint?

A. Not so far as I know.

Q. Then that objection on the score of lack of uniformity of color applies only to the white paints?

A. To the light paints, yes, sir.

Q. The white paints and the very light tints?
A. Yes, sir.
Q. And not to any other?
A. As far as I know it would not." (Trans., 265; Rec., 464, 465.)

Mr. Joystad testified:

"Q. The objections, then, which you stated to zinc lead white were objections which you found by experimenting with it in paste form?
A. Yes, sir.
Q. One of those objections is that its whiteness is not perfect?
A. Yes, sir.
Q. Now, would that be a valid objection if zinc lead white were used in any other shades but whites and light tints?
A. No, there would be no objection there." (Trans., 318; Rec., 554.)

Mr. Toch testified:

"Q. Would a slight variation of color be any valid objection to the use of zinc lead white as a pigment in mixed paints?
A. Not the slightest.
Q. Would even a large variation be an objection in any but the light shades?
A. Not the slightest." (Trans., 367; Rec., 637.)

Mr. Lane testified:

"Q. How about the whiteness of zinc lead white?
A. It is not as white as other pigments, but still there is no objection to using it in white mixed paint; a very fine white can be made.
Q. Using it in a certain proportion?
A. Yes, sir.
Q. Not as the exclusive white pigment, if you intended to make a very white paint?
A. No, by the addition of some zinc or by the addition of some carbonate of lead, or using it straight and a slight addition of ultramarine

blue, it would throw it into a bluish cast which when exposed to the air would bleach to a very pretty white.

Q. How about using it in any other paint than the one intended to be a pure white?

A. No objection at all, where the white pigment would be used of that class, an opaque white pigment." (Trans., 410; Rec., 709, 710.)

Zinc lead white is not crystalline. It is amorphous. It does not, after grinding, assume crystal shape.

Mr. Toch testified:

"Q. Mr. Joystad, speaking of zinc lead white, says that it does not fill the bill because it is crystalline; after its grinding, in a few years, it comes back to crystal again. What have you got to say about that?

A. I should say that was a new one on me. I never heard anything like that.

Q. Have you ever found any such trouble?

A. No, sir. It isn't crystalline and it is just as amorphous as sublimed white lead, and it works just as easily." (Trans., 375, 376; Rec., 652.)

Mr. Lane testified:

"Q. Mr. Joystad informed us that the objection which he had to the use of zinc lead white as a pigment in mixed paints was that it is crystalline and that after grinding it, in a few years, it comes back to crystal again; what do you say about that, Mr. Lane?

A. Mr. Joystad is wrong; it is not crystalline, it is amorphous.

Q. Did you ever find that zinc lead white assumes crystal shape after grinding?

A. No, sir." (Trans., 409, 410; Rec., 709.)

Apart from the untenable objections referred to, zinc lead white is unobjectionable.

Professor Ladd testified:

> "Q. I have asked you to name the objections to the use of zinc lead white, assuming that, as now produced by the United States Smelting Company, it carries zinc sulphate only in an unappreciable quantity. If you disregard for a moment the objections that you have mentioned in the bulletin, namely, that it is not always uniform in composition or in color, what other objections do you know to its use?
>
> A. Don't know of any." (Trans., 266; Rec., 467.)

3.—The Qualities of Lithophone.

Note: "Zinc Sulphide Whites" and "Lithophone" are synonyms.

Lithophone is fully as opaque as carbonate of lead. Its color is the purest white of any white pigment. It is a complete chemical body and is therefore absolutely inert and possesses great durablity. Its insolubility and great hardness make it especially valuable for use in floor paints. It is the ideal pigment for enamel paints, the latter forming a considerable part of the mixed paint industry. Its particles are extremely fine and it works smoothly under the brush. Owing to its light specific gravity, it keeps well in suspension in the can.

It cannot be used to advantage in white or light tints of paint intended for outside use, because of its photogenic action; i. e., because it tends to turn grey under the influence of sun rays. But this tendency does not affect its usefulness in any other than white or light tints nor in paint intended for use on the inside of buildings, nor in a first coat of paint which is covered by another coat.

Prof. Ladd's Bulletin says (Trans., 54; Rec., 85):

> During the past twenty-five years considerable attention has been given to the manufacture of zinc sulphide whites and at the present time they are being manufactured on a large scale and are found on the market under a variety of names as indicated above.
>
> Zinc sulphide possesses what to the painter is of great importance, "body," *i. e.*, opacity or the ability to hide or obscure the surface over which the paint is spread. It, however, possesses the defect that its color is apt not to be good, but by introducing other bodies and preparing the sulphides in a special manner, a pigment having good color and good "body" may be obtained. The exact composition of the pigment will depend upon several factors, the proportion between the barium and zinc salts used may be varied, while duration of the calcination to which the pigment is subjected will influence the result by increasing the proportion of oxide in the pigment.
>
> As made by this process, Orr's white has the composition—

Barium sulphate, $BaSO_4$	69.915 per cent.
Zinc sulphide, ZnS	14.698 per cent.
Zinc oxide, ZnO	13.337 per cent.
Water	2.050 per cent.
	100.000

A sample of lithophone, another of the zinc sulphide whites examined by Hurst, had the following composition—

Barium sulphate, $BaSO_4$..... 67.96 per cent.
Zinc oxide, ZnO..... 7.32 per cent.
Zinc sulphide, ZnS..... 24.85 per cent.

The zinc sulphide whites have a body usually equal to that of white lead and often superior to it and also possess the advantages of not being discolored by hydrogen sulphide and of being non-poisonous. They mix well with all pigments except those having lead or copper as their base. In which case, they are apt to cause a black discoloration due to the sulphur they contain. They are used chiefly for inside white house paints, for which purpose they find a very wide use in Europe and their use is extending rapidly to this country.

Professor Ladd testified:

"Q. You have stated as another objection to lithophone that it cannot be used in connection with lead. Did you mean that it cannot be used in connection with sulphate of lead?

A. No, sir, lead carbonate. (Trans., 267; Rec., 468.)

Q. I desire also to call your attention to what Mr. George B. Hurst, the same author, says in his later work published in 1902, bearing the title 'The Painter's Laboratory Guide.' I quote from page 84: 'The lithophone whites are excellent pigments. When well made they are of a good white color, are fully equal and in many cases, are superior to white lead in covering power, while it possesses the advantage of not being discolored by sulphur compounds. It is non-poisonous, it mixes well with almost all other pigments except lead and copper pigments, which are liable to be discolored from the formation of the sulphides. Being lighter in gravity than the white lead, it does not settle so freely when mixed with oil into

paints'. Do you subscribe to that from what you know of lithophone?

A. In general, yes, sir." (Trans., 269; Rec., 472.)

Mr. Toch testified:

"Lithophone is a zinc sulphide and barium sulphate, made by double decomposition, and is a pure white pigment which has very great covering property, extreme fineness and exceptional merit for many paint purposes.

Q. State what objection there is to lithophone as a pigment?

A. I don't know any particular objection to it; I have always favored it very much and I use a great deal of it myself.

Q. Well, its photogenic action is what I refer to.

A. Oh, I beg pardon, yes. It is presumably supposed to absorb light during the day and give it out again during the night, and in the process of absorption it turns color, turns grey, and it turns white again in the darkness.

Q. State whether or not this objection is of any importance when lithophone is used in paints covering inside surfaces?

A. It is no objection to it at all, and no objection in making light tints.

* * * * *

Q. Then you mean to say that it has no objection except possibly in the case of outside white paint?

A. Outside white.

* * * * *

Q. This photogenic tendency is no objection to lithophone as long as it is used, even on the outside, in paint as a first coat?

A. None at all.

* * * * *

Q. State whether or not lithophone is widely used to advantage in enamels?

A. Lithophone is used very widely to advantage in enamels.

Q. What is an enamel?

A. An enamel is a pigment ground in a varnish which dries fairly rapid and with a high gloss.

Q. Are enamels a considerable portion of the paint business?

A. They are.

* * * * *

Q. Is there a special advantage of lithophone over carbonate of lead or oxide of zinc in floor paints?

A. Oh, yes, there is a great advantage.

Q. Namely?

A. The fact of the indivisibility of the pigment and the insolubility of the pigment and the hardness of the pigment, all of which advantages are contained in lithophone and are not possessed by the statutory pigments.

Q. Are there any other mixed paints in which lithophone is properly used and used with decided advantage?

A. There are many uses for lithophone in the paint industry, the making of interior paints, wall paints, wall enamels.

Q. What are the qualities of lithophone which make it especially useful in enamels?

A. Lithophone must be used in many enamels, owing to the fact that the statutory pigments combine with the varnish and form compounds which ultimately unfit the enamel for use. Lithophone, being a complete chemical compound, is not affected either by the acids in the linseed oil or by the resin in the varnish.

Q. Is varnish necessarily used in enamels?

A. Yes, sir.

Q. How about the value of lithophone in mixed paint as tending to keep the pigment in suspension in the oil?

A. Its specific gravity is such that it tends to suspend the paint much more readily than either of the statutory pigments.

Q. Notwithstanding its light specific gravity, state whether or not lithophone is as opaque or more opaque than the statutory pigments?

A. It is more opaque than zinc and probably as opaque as lead. (Trans., 119-122; Rec., 197-201.)

Q. Prof. Ladd, in his testimony, stated that lithophone cannot be used in connection with lead, or cannot be used satisfactorily as a paint where lead paints have been previously employed on the surface. What is your opinion about that?

A. I am free to differ with Prof. Ladd on that subject.

Q. Do you differ on theory only?

A. No, sir.

Q. Or do you differ also as a matter of practical experience?

A. Absolutely on a matter of practice.

Q. Why do you differ as a matter of theory?

A. A properly made lithophone should not contain any soluble sulphide salts, and, if it doesn't contain any soluble sulphide salts, it cannot react on lead.

Q. In your experience with lithophone you have found it to be practically inert, have you not?

A. It is absolutely inert as a pigment.

Q. Inert also upon lead?

A. Yes, sir.

Q. And you have used lithophone very extensively, have you not?

A. Very extensively for nineteen years.

Q. And have you also used it in connection with lead, or where it came in contact with lead?

A. Where it came in contact with lead. (Trans., 368, 369; Rec., 640.)

Q. Prof. Ladd says that lithophone becomes streaky in appearance from reaction with lead, if lead were present in a previous coat of paint. What will you say about that statement?

A. If it ever does become streaky, it is not due to the lead; it is due to the conditions in the oil.

Q. Would lithophone be to blame, then, for the streaky appearance?

A. No, sir.

Q. What would be to blame?

A. The ignorance of the manufacturer in using an oil which is too acid. (Trans., 369; Rec., 640; 641.)

Q. Did I understand you to say that the methods of manufacturing lithophone have been very greatly improved in the last six or seven years?

A. Yes, sir.

* * * * *

Q. And has that improvement, in your opinion, very greatly improved the quality of lithophone as a pigment?

A. Yes, sir.

Q. And you would regard the lithophone now upon the market as a far more valuable pigment than the article which appeared six or seven years ago?

A. Yes, sir." (Trans., 397; Rec., 687; 688.)

Mr. Lane testified:

"Q. How about lithophone now?

A. I have examined lithophone in its different forms, under different trade names, practically the same in each of them. I consider that lithophone is a valuable pigment and has its uses.

Q. What is its value?

A. Its value is the hiding power the pigment possesses, its extreme fineness of particles, and especially its color. It is the whitest pigment that we have. It mixes readily with the different varnishes made from the different gums, includes them all. I have never met a varnish or found a varnish that would not mix readily with lithophone, and for that rea-

son I consider it an ideal pigment for inside enamels or enamel paints.

* * * * *

Q. Now, so far as inside work is concerned, where the effect of the light is not so strong, what would you say as to whether its aptitude to change color under the influence of light is an objection to it?

A. We are assuming that we are using the best grade?

Q. Surely.

A. No objection.

Q. How about floor paint?

A. Lithophone is a good pigment to use in floor paint.

Q. How does it compare with other pigments as an ingredient of floor paint?

A. It compares very favorably, excels most of them.

Q. What quality does it give to an enamel which is desirable in an enamel?

A. It gives opacity or hiding power, free working qualities, as compared with other white pigments.

Q. Compare it with the statutory pigments and not the other pigments?

A. Well, there is only one of the statutory pigments that we could really use for an enamel, and that is oxide of zinc.

Q. How does it compare with that then?

A. It has better covering or hiding properties. It works freer under the brush, flows out better. By that I mean wipes off its brush marks, doesn't show the brush marks such as oxide of zinc enamel would, and it would have a higher gloss if used in the same vehicle. (Trans., 162, 163; Rec., 275-277.)

Q. Have you ever used lithophone in connection with lead?

A. Yes, sir.

Q. Have you found any objection to it in that connection?

A. Not in the lead I used it with, no, sir." (Trans., 410; Rec., 710.)

Mr. Joystad testified:

"Q. Now, these twelve colors which you find on the card which I show you, all different, which ones would you say would prevent the use of lithophone?

A. I should think the yellow.

Q. Only the yellow: the cream yellow and the old ivory yellow?

A. Yes. (Trans., 322; Rec., 561.)

* * * * *

Q. In all other shades of enamels than cream and old ivory, you could use lithophone to excellent advantage, couldn't you?

A. Well, I suppose you could." (Trans., 323; Rec., 563.)

Mr. Cook testified:

"Q. And inasmuch as you have only used it to a very slight extent, you are not prepared, Mr. Cook, to condemn lithophone as a useless or valueless pigment, are you?

A. Well, from what I know about it, I wouldn't want to have it about my factory; if I had a factory of my own, I wouldn't have it in the shop.

Q. You mean that, because workmen who are ignorant of its quarrelsomeness when used in connection with carbonate of lead might put it in combination with carbonate of lead and then mischief would arise?

A. Yes, sir.

Q. That expresses the whole reason, does it?

A. Yes, sir." (Trans., 352; Rec., 612.)

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4.—The Qualities of Zinc from Western Ores.

The answer admits that zinc from Western ores, provided it contain not exceeding five per cent. of sulphate of lead, is a useful, valuable and efficient pigment.

(Paragraph 2 of Answer; Trans., 422-3; Rec., 729, 730.)

The claim of the answer (Abst., 423) that the presence of more than five per cent. of sulphate of lead in Western zinc injures and lessens its efficiency and value as a pigment is supported by nothing except Prof. Ladd's palpable misinterpretation of a passage in a book of Mr. Hooker.

Prof. Ladd testified:

"Q. Now, read the particular place from which you infer that Mr. Hooker regards lead sulphate as an objectionable ingredient.

A. * * * He says, 'Even a small amount of lead will cause serious trouble to the maker of *white rubber,* a special selection being required for that particular grade of work. As a painter's pigment, however, the presence of a little lead is of no consequence.'" (Trans., 260; Rec., 457.)

"Q. I am asking you whether you can point out any other authority than this sentence from Mr. Hooker's book, which you have interpreted in your own way, and which authorities say that sulphate of lead is an objectionable ingredient in paint?

A. No, sir, I don't know as I can, any authorities, without going over the works again." (Trans., 261; Rec., 458.)

Mr. Toch testified:

"A. Mr. Hooker does not mean to imply that the lead in the Western zinc is deleterious.

Q. He is speaking in this connection of zinc oxide, is he not?

A. Yes, sir.

Q. And he says that the presence of a little lead in zinc oxide would be of no consequence as affecting the quality of the zinc as zinc oxide?

A. That is correct.

Q. For painting purposes?

A. For painting purposes.

Q. But it would affect it most injuriously for purposes of white rubber manufacture?

A. For purposes other than paint." (Trans., 367; Rec., 638-9.)

Sulphate of lead is valuable as a paint pigment.

Prof. Ladd testified:

"Q. Now, I ask you whether we have not Mr. Hurst's word as authority for the proposition that sulphate of lead is valuable as a paint pigment?

A. It is valuable as a paint pigment, yes, sir.

Q. And when Mr. Hurst says that sublimed white lead is more permanent than white lead because sulphurous gases and vapors have little or no action upon it, he bases that, does he not, upon the fact that there is sulphate of lead in sublimed lead, rather than carbonate of lead?

A. Yes, sir." (Trans., 261; Rec., 459.)

Zinc from Western ores, by reason of its carrying lead sulphate, is superior, or at least equal to statutory zinc oxide. Freight cost is the only factor in the choice of manufacturers between statutory zinc oxide and zinc from Western ores.

Mr. Toch testified:

"Q. Now then as to zinc from Western ores, carrying a varying percentage of oxy-sulphate of lead; what is your opinion as to the value of these pigments?

A. Oh, a zinc oxide which carries lead is superior for paint purposes to a zinc which contains no lead.

Q. Is zinc made from Western ores used in the East?

A. Not to my knowledge.

Q. Can you tell me the reason why it is not used?

A. For the reason it is too expensive; it costs more than the zinc mined in New Jersey.

Q. Is that the only reason which you know of why it is not used in the East or used as far East as the freight rates tend to make it too expensive?

A. That is the only reason I know of." (Trans., 119; Rec., 196.)

Mr. Lane testified:

"Now that I am in the West, I do not use the Eastern zinc oxide, I use the zinc from Western ores, because I am nearer the fields.

Mr. ZEISLER: And formerly?

A. And formerly I was nearer the other field.

Q. (By Mr. WATSON): But if you were at a place in the United States where the transportation charges were the same upon each of these articles, then *the statutory pigment,*

which is oxide of zinc produced in New Jersey, would be the better article, would it not?

A. It would not." (Trans., 183; Rec., 311.)

Mr. Joystad testified:

"Q. You use for your outside whites, the first grade of Mineral Point Zinc, do you?

A. For outside, for all of them clear through.

Q. You don't use any of the New Jersey zinc at all?

A. No, not in the last couple of years, I haven't." (Trans., 316; Rec., 550, 551.)

Mr. Cook testified:

"Q. You then contend that a good paint can be made by the combination of carbonate of lead and zinc from Western ores?

A. Yes, sir, if you have good oil." (Trans., 350; Rec., 608.)

Whatever percentage of lead sulphate is present in zinc from Western ores is incidental to its production.

Prof. Ladd testified:

"Q. I understood you to say that all zinc from Western ores carries some lead sulphate in its natural composition; is that correct?

A. I have said that I understood that it did.

Q. Now, whether that percentage is five per cent. or ten or fifteen per cent., the lead sulphate is always present as a part of the original state of the ore?

A. The lead is present, yes, sir.

Q. Then, whatever amount of lead sulphate is present in zinc from Western ores is present there as I understand, as an incident to the manufacture of that pigment, because it is carried in the natural composition of the ore?

A. It is, yes, sir." (Trans., 266; Rec., 467.)

5. The Age of Class A Pigments and the Extent of Their Use and Recognition.

Class A pigments have been commercial products for about twenty years. Improved processes of manufacture have constantly improved their qualities and usefulness.

Mr. Toch testified:

"Q. (By Mr. Watson): But a good many of them are so new in the world of commerce that their values are not generally recognized or known yet, are they?

A. Not a good many. I don't classify the paint materials in Class A as being new.

Q. Well, you would a good many of those in Class B, wouldn't you?

A. Class B are almost all older than Class A.

Q. Well, you take sublimed lead and you say that as it is produced now, it is very much better and more even than it was originally produced; is that what you say?

A. Yes, sir.

Q. And I understood you to say, in answer to a question of Mr. Zeisler, that its qualities and usefulness for the purpose of paint had been very greatly increased for the past five years?

A. Yes, sir.

Q. Was that true?

A. That was true.

Q. And it is an evolutionary process of development. is it, from a material of ordinary value to one of greater value?

A. Yes, sir.

Q. That is what you mean, is it?

A. That is exactly what I mean.

Q. And this process, in your opinion, is increasing its value from time to time or year to year?

A. Naturally.

Q. The state of the art is such that new things are learned and applied in its manufacture to its improvement?

A. There is, sir, yes, sir." (Trans., 144-5; Rec., 242-3.)

Mr. Lane testified:

"Q. (By Mr. Watson): Do I understand you to agree with Mr. Toch in the testimony which he gave yesterday, that the process of producing sublimed white lead has undergone many changes and that, with time and the new discoveries and improvements that are made, that it is a good deal improved in quality over what it was at first?

A. Yes, sir.

Q. And the sublimed lead which you have to-day upon the market is a very different product from what it was originally, considerably better, and that improvement has gone on steadily, has it, for the last fifteen or twenty years?

A. Apparently." (Trans., 191-2; Rec., 325-6.)

Professor Ladd testified:

"Q. Can you tell us about how long sublimed white lead has been produced as a commercial product in the United States?

A. At least twenty years.

Q. And not before that time, as you understand it?

A. It may have been to some extent, but as a commercial product I should say not more than twenty years.

Q. And for what length of time has standard zinc lead white, commonly called zinc lead, been an article of commerce produced and consumed in the United States?

A. For a much less time than that.

Q. And for how long has zinc made from western ores carrying sulphate of lead and ox-

ide of zinc in varied proportions, how long has that been produced as an article of commerce in the United States?

A. I am not sure, but I think about the same length of time. I can not say for certain.

Q. And lithopone?

A. Lithopone perhaps fully as long from the first, but it has only recently come in again as a product. for the general use." (Trans., 222; Rec., 382, 383.)

It is an opinion generally held among paint manufacturers who know their business, that better paint can be made from the Class A and B pigments than from the statutory pigments.

The allegation of the answer, "upon information and belief", that one-half of the leading paint manufacturers reject the Class A pigments in the preparation of mixed paints is based upon nothing except a misconstruction of the following evidence of Mr. Toch:

Mr. Toch testified:

"Q. (by Mr. Watson): Now. while you have expressed the opinion, Mr. Toch, that a better and more valuable paint can be made from the pigments in Classes A and B than from the statutory pigments, you would not claim that that is an opinion which is universally or even generally held among paint manufacturers, would you?

A. I would, among those paint manufacturers who know their business. I would expect that.

Q. Are there not a large number of paint manufacturers who contend that the statutory pigments are the only proper ones, the only sat-

isfactory ones to be used in the manufacture of paint?

A. There may be some who contend that.

Q. Are there not large manufacturers of paints at this time who do not use any of these substitutes described in A and B, but who practically or substantially make their paints out of the statutory pigments?

A. Not a majority that I know of.

Q. I didn't ask about the majority; I asked you if there were not a considerable number.

A. I *wouldn't even say a considerable number,* because there are only perhaps one hundred recognized or large paint manufacturers, mixed paint manufacturers, in the United States; I don't think there are any more; and out of that one hundred I am quite sure that not the majority uses statutory pigments.

* * * * *

Q. Now, you say you do not believe a majority of these 100 of the leading or largest manufacturers of paint use only the statutory pigments in the manufacture of mixed paints; is that what I understand you to say?

A. That is correct.

Q. Well, then, in your opinion would the number be about equally divided, would there be about one-half of that one hundred who would use only the statutory pigments and the other half using either the statutory pigments or those mentioned in A and B in combination therewith?

A. Not having tabulated it, I would prefer not to give an exact answer. I really do not know the number.

Q. Well, as nearly as you are able to tell us, will you tell us?

A. As nearly as I am able to tell you, it is simply that I meet the paint manufacturers and am frequently asked and know their formulas, know the formulas of many of them and I understand that to-day this man would use zinc

lead, another man would use sublimed lead, a third man would use zinc oxide and barytes, and a fourth man would use the statutory pigments plus barytes or plus magnesium silicate, and so on, so that I have never yet found any two to make identically the same thing.

Q. The manufacturer who confines himself to the statutory pigments—they being, as I understand you, about fifty per cent. of these one hundred large manufacturers—would contend just as strongly that the statutory pigments were the only proper ones as you would contend that it is permissible to use these others without destroying or impairing the usefulness of the paint?

A. I suppose they would say that.

Q. There would be this well-defined cleavage of opinion, and it does exist to-day between the manufacturers, does it not, on that subject?

A. It does.

Q. And it is not a settled question at all so far as the manufacturers are concerned as to the usefulness or efficiency as substitutes of these pigments mentioned in A and B over the statutory pigments?

A. That is very true. On the other hand, fifteen or twenty years ago there were a greater number who believed in the statutory pigments and, as we go along, we learn and progress. There are some paint manufacturers who probably are not as progressive as others and they have not altered their methods.

Q. And out of this kind you think that about fifty per cent. of this total of one hundred large manufacturers are convinced that it is proper and all right to use as substitutes the pigments mentioned in A and B?

A. Oh, the question of fifty per cent. is *merely a guess.*

Q. However, it is your best guess?

A. It is my opinion that probably that may be it, more or less." (Trans., 133-4; Rec., 220-222.)

"Q. (By Mr. Zeisler): Did you mean to be understood as saying that one-half of the leading manufacturers of paint in the United States cling to the prejudice in favor of carbonate of lead and oxide of zinc to the exclusion of all other white pigments of both Class A and Class B?

A. I did not. I said, or intended to convey, that fifty per cent., more or less, of the paint manufacturers used materials in Class A and B; I do not pretend to know what the others use; *I only speak about those of whom I know.*

Q. Then, if I understand you correctly, you mean to say that approximately half of the leading manufacturers of the United States to your knowledge use other pigments than the statutory pigments, either in the place thereof or in connection therewith; is that correct?

A. That is correct.

* * * * *

Q. State whether or not you have any knowledge which would enable you to say that one-half of the leading paint manufacturers of the United States exclude all pigments of Class A and Class B?

A. I certainly could not state that. *I have every reason to believe that every manufacturer, with a few possible exceptions, uses some material in Class A and Class B.*" (Trans., 139; Rec., 232, 233.)

The prejudice clung to by some manufacturers in favor of the statutory pigments is merely a repetition of history. Oxide of zinc which is now sanctioned by the statute had to fight for recognition for thirty years.

Mr. Toch testified:

"Q. But from the time that oxide of zinc first was introduced to the time when it became generally recognized as a proper opaque white

pigment, is it not true that a number of manufacturers of paint clung to carbonate of lead as the one proper opaque white pigment?

A. If I am correctly informed, it took about thirty years to introduce oxide of zinc to the commercial world as a paint pigment.

Q. And until it was and became generally recognized, state whether or not there was a prejudice in favor of carbonate of lead and against oxide of zinc to which some manufacturers continued to cling?

A. I can safely state that that was the case, even with my father, who was a paint manufacturer, in a very small way, as far back as 1848.

Q. State whether or not there is a difference in principle between the prejudice that existed for a long time against oxide of zinc until it became generally recognized and the prejudice to which now some of the manufacturers continue to cling in favor of the statutory pigments as against other pigments?

A. History repeats itself." (Trans., 138, 139; Rec., 231, 232.)

E. The Qualities of Class B Pigments.

1.—General Characteristics.

The chemical inertness of Class B pigments makes them immune to decomposing influences and gives them great durability. Their practical indestructibility enables them to serve the purpose of protection better than the statutory pigments.

Doctor Dudley testified:

"Q. What is the quality possessed by the Class B pigments which you have mentioned, which gives them the value that you have spoken of?

A. Largely, it seems to me, inertness to chemical change, they being permanent chemical bodies which do not readily lend themselves to combinations with any of the constituents of the oil.

Q. What would you say as to the influences of gases and atmospheric conditions upon the Class B pigments?

A. They are likewise more inert towards gas and atmospheric conditions, and consequently the paint layer contains, therefore, a percentage of material which does not change readily." (Trans., 79; Rec., 118, 119.)

Mr. Lane testified:

"Q. What, in your opinion, as the result of your practical experience, is the value, if anything, of the Class B pigments?

A. They are a very valuable set of pigments and in many cases the paint industry could not exist without them.

* * * * *

Q. How about the quality of durability?

A. They are all very durable. Being inert, they seem to have no effect on the linseed oil, and they last a very long time." (Trans., 166; Rec., 281-2.)

Prof. Ladd testified:

"Q. State from your knowledge as a chemist—I ask for that, as you appear to have no knowledge whatsoever from a practical point of view—whether inert pigments do not possess the quality of indestructibility to a greater degree than those pigments which are not inert?

A. Yes, sir, of indestructibility.

Q. If the sole purpose, therefore, were to protect the surfaces and if the question of beautifying and hiding were not sought to be attained, then you would regard the inert pigments as the most excellent, would you not?

A. They would serve to protect, yes, providing there were linseed oil to hold them in place." (Trans., 271; Rec., 474-5.)

The inherent defects of the statutory pigments may be largely overcome by adding thereto one or more of the Class B pigments. Such addition insures greater durability, better working under the brush, better suspension in the can and the leaving of a better surface for repainting; such addition does not detract from the useful qualities possessed by paint containing only statutory pigments.

Mr. Lane testified:

"Q. Take any paint in which lead and zinc are indispensable, and assume that the statutory pigments are used for that purpose, which would you prefer, taking all qualities of paint into consideration, a combination only of the statutory pigments or a combination between the statutory pigments and one or another or more of the Class B pigments?

A. The combination where the Class B pigments were used.

Q. For what reason?

A. They would keep better in the package, they would work better under the brush, they would present a better and stronger resisting surface, they could and would be readily repainted.

Q. When you speak of greater resistance, do you make a distinction between that and durability?

A. It is the same, it is durability.

Q. But there are two kinds of resistance, a resistance to physical contact and resistance to atmospheric conditions.

A. Class B pigments resist in both cases, provided the proper Class B pigments had been selected." (Trans., 166-7; Rec., 282.)

Doctor Dudley testified:

"Q. Have you found it necessary to add to a combination of carbonate of lead and oxide of zinc some other pigment in order to overcome, at least in part, the defects to which the combination between the carbonate of lead and oxide of zinc is subject?

A. We have found it extremely desirable to mix a third pigment with the combination of the statutory pigments.

Q. Desirable in what direction?

A. As giving longer life to the paint layer particles.

Q. Have you found it possible to add a third pigment or perhaps a combination of third pigments to a combination of carbonate of lead and oxide of zinc whereby on the one hand the wearing quality of the paint is considerably enhanced without at the same time detracting from the other useful qualities possessed by a combination only of carbonate of lead and oxide of zinc?

A. I think I may safely say yes.

Q. Will you name one or more of such additional pigments?

A. A combination of the statutory pigments with barytes, with silica, with gypsum." (Trans., 78; Rec., 117, 118.)

Mr. Toch testified:

"Q. Has it formed the study of paint manufacturers and experts how the defects of the statutory pigments or a combination of the two may be overcome?

A. Yes, sir.

Q. How long?

A. Oh, as far back as I can remember.

Q. Has any definite result been attained among those considered best informed?

A. Yes, sir.

Q. What is that result?

A. It has been definitely found that the admixture of inert materials to mixed paints improves them and increases their durability.

Q. Without detracting appreciably from their useful qualities?

A. Without detracting at all.

Q. By inert materials, do you mean, for instance, materials in Class B?

A. Materials in Class B, yes, sir, and likewise materials in Class A." (Trans., 114, 115; Rec., 188.)

Paint cannot be made as good by excluding Class B pigments as it can be made by using them.

Mr. Lane testified:

"A. Mixed paints, used inside or outside for any purpose, or floor paints inside or outside for any purpose, cannot be made as good by excluding Class B pigments as they can be made by the addition of Class B pigments." (Trans., 173; Rec., 293.)

One-third of the entire pigment body may consist of Class B pigments without impairing any useful quality of the paint.

Doctor Dudley testified:

"Q. Do I understand you to say that a mixture containing one-third carbonate of lead, one-third oxide of zinc and one-third of one or more of the Class B pigments would make a highly satisfactory mixed paint?

A. I think so, yes, sir." (Trans., 79; Rec., 120.)

Mr. Lane testified:

"Q. Up to what percentage would you consider safe to go in adding a Class B pigment without detracting from the desirable qualities or degree of opacity or without detracting from any other useful quality of the paint?

A. And use both of the statutory pigments?

Q. Yes.

A. Equal parts of the three.

Q. You mean one-third of each of the three?

A. Yes, carbonate of lead, oxide of zinc and the Class B pigment." (Trans., 166-168; Rec., 281-285.)

Any Class B pigment, except barytes, prevents settling of the statutory pigments in the can.

Mr. Toch testified:

"Any pigment in Class B except barytes will prevent the settling of the statutory pigments.

Q. Bartyes you except on account of its high specific gravity?

A. High specific gravity, yes." (Trans., 125; Rec., 206.)

If the supply of the statutory pigments were exhausted, fully as good paint could be made by the use of Class A and Class B pigments.

Mr. Toch testified:

"Mr. Toch, please state whether, if the supply of carbonate of lead and oxide of zinc were to give out absolutely, as good paint could be made by using the materials in Class A and Class B, and possibly some other materials in

addition thereto, as can be made with the use of carbonate of lead and oxide of zinc?

A. Yes, indeed." (Trans., 125; Rec., 206, 207.)

Mr. Lane testified:

"Q. Suppose the supply of carbonate of lead and oxide of zinc were to give out absolutely, could you make as good paint with the rest of the white pigments, the pigments of Class A and the pigments of Class B, as you now can make with using the statutory pigments?

A. Yes, sir, and as far as I am concerned, they have ceased to exist." (Trans., 173; Rec., 293.)

At the same price paint containing Class A and Class B pigments is preferable to paint containing only statutory pigments.

Doctor Dudley testified:

"Q. (By Mr. WATSON.) * * * I want to know, then, if the price of a barrel of mixed paint was the same, whether you used statutory pigments alone or whether in connection with them you used some of the substitutes referred to in A and B, you nevertheless would choose the substitutes?

A. I would." (Trans., 107; Rec., 173.)

2.—The Merits of Barytes in Particular.

According to Hurst's work, regarded as a high authority by Prof. Ladd (Trans., 238; Rec., 415), Barytes, by reason of its insolubility and inertness, is of great permanency; its opacity is below that of carbonate of lead, but above that of oxide of zinc; it mixes well with oil.

Professor Ladd testified:

"Q. Coming now to barytes. I will call your attention to page 77 of Hurst's work, where he says under the head of 'Properties and Composition of Barytes'—I read beginning with the fourth line: 'It is quite *unsoluble* in all acids and alkalides, a property, or rather properties, which distinguish it from all other white pigments. It is *quite unaffected by any injurious influences* such as affect white lead, and therefore, as a pigment, it is the *most permanent* white known. For this reason it has been called and sold as constant white, permanent white, etc. In body or covering power it is much inferior to either white lead or china clay, but it is better than zinc white. It mixes very well with white oil, of which it takes about seven per cent. to grind into a stiff paste. As an oil paint it is satisfactory to use, but for water colors it is not so good, seeming to lose some of its body on mixing with water.' Did I correctly quote Mr. Hurst?

A. You did in the parts read." (Trans., 270; Rec., 473.)

Barytes is a stable, durable, unchangeable chemical body, and as such an absolutely ideal pigment for the preservation of surfaces. Deficient opacity is its only shortcoming.

Dr. Dudley testified:

"I have absolutely no objection whatever to barytes when it is used in proper amount. It is a perfectly stable, durable, unchangeable chemical body and as such absolutely ideal for the preservation of surfaces." (Trans., 81; Rec., 123.)

Mr. Joystad testified:

"Q. Now, then, I understand that you object to the use of barytes in appreciable quantities in white paints and in the very light shades of paint because, in your opinion, barytes has not sufficient opacity, is that correct?

A. That is exactly it.

Q. That is the only reason?

A. Falling short in that manner.

Q. And that is the only shortcoming that you know of?

A. That is the *only shortcoming* I know of in barytes.

Q. You know that it is an indestructible body?

A. Yes, sir.

Q. Permanent body?

A. Yes, sir.

Q. It does not decompose?

A. No.

Q. And that is, on the other hand, quite an advantage, isn't it?

A. It is in some cases, yes; for most cases.

Q. For protecting purposes that is a great advantage?

A. Yes, sir, only falling short in the opaque part of it.

Q. Now, the opacity or hiding has to do with making a beautiful surface?

A. Yes, sir.

Q. Covering up all the blemishes on the surface that is to be painted?

A. Yes, sir.

Q. But hiding power has nothing to do with protecting the surface from the influence of the elements and from physical contact?

A. Well, it has to do, of course, with the durability.

Q. I say the hiding power has nothing to do with protecting the surface?

A. No.

Q. Now, do you regard the protection to be given to a surface to be covered with paint as an important element?

A. I do.

Q. So that barytes is capable of performing a very important purpose in mixed paint so far as protecting the surface is concerned, isn't that so?

A. Protecting is all right, and falling short—

Q. I asked you about protecting. For the protecting purpose it is very good, isn't it?

A. Very good, yes.

Q. Now, then, there are a number of shades of paint when you get into the darker shades of paint where the opacity is furnished by the coloring matter, isn't there?

A. Yes.

Q. And in such cases where sufficient opacity is furnished by the coloring matter, you have absolutely no objection to the use of barytes, have you?

A. No, not in them cases; no.

Q. And, on the contrary, you would say that the presence of barytes in such paint where sufficient opacity is furnished by the coloring matter is rather an advantage by reason of the permanence of the body?

A. Well, it is about as good as any.

Q. Well, isn't it better than a good many?
A. Yes, better than a good many." (Trans., 326, 327; Rec., 566-568.)

Neither the necessary opacity nor any other useful quality of paint is injuriously affected by using natural barytes to the extent of one-third or artificial barytes to the extent of one-half of the entire white pigment body, but on the contrary it adds useful qualities to the paint.

Mr. Toch testified:

"Q. Take, for instance, barytes, sulphate of barium, what percentage of sulphate of barium would you regard as useful without detracting in any wise from the value of the paint, assuming that that paint contains carbonate of lead and oxide of zinc?
A. There was two, barytes and sulphate of barium.
Q. Take either, or take one after the other.
A. Well, I should take one after the other. The natural can be used to the extent of one-third——
Mr. WATSON: Natural, did you call that?
A. Yes, sir, there is natural and artificial. The natural can be used to the extent of one-third.
Q. You mean one-third of the entire body of the white pigment?
A. One-third of barytes and one-third of each of the statutory pigments. The artificial can be used up to and perhaps beyond one-half and is very largely used for the purpose of giving paint additional physical qualities." (Trans., 115; Rec., 188, 189.)

Mr. Lane testified:

"Q. (by Mr. WATSON): Is there any class of mixed paint which, in your opinion, will admit of the employment of more than 30 per cent. of barytes without the paint itself being made impure and without very seriously impairing its qualities as a paint?

A. Oh, yes, there are a number.

Q. Well, what is the highest percentage which, under any circumstances, can be safely used of barytes?

A. 95 per cent." (Trans., 188, 189; Rec., 320, 321.)

According to the official U. S. Geological Survey of 1904, barytes is not an adulterant, but adds to the permanence of substance and of color of the paint. This statement is borne out by numerous tests and experiments.

Mr. Toch testified:

"Q. I will show you a book here and will ask you to state what it is.

A. 'Mineral Resources of the United States, Calendar Year 1904, Department of the Interior, United States Geological Survey, Charles D. Walcott, Director.'

Q. For what year?

A. 1904.

Q. And printed by whom?

A. Printed in Washington by the Government Printing Office, 1905.

Q. I will ask you to turn to page 1095 of that book and read what is there said about the value of barytes.

A. 'The value of barytes as a white pigment is being recognized more and more each year, and although there may be very little, if any, that is used alone for this purpose, it is used in large quantities to mix with white lead, zinc white, or a combination of both of these white

pigments. This addition is *not an adulterant*, as was the case a few years ago, for it is now appreciated that the addition of barytes makes a white pigment *more permanent, less likely to be attacked by acids*, and *freer from discoloration* than when white lead is used alone. It is also believed that the barytes gives greater body to the paint and makes it *more resistant to the influence of the weather*. As is well known, pure white lead, when it remains in the shade or in a dark place, becomes discolored, turning yellowish, while mixtures of white lead and zinc white or of white lead and barytes, or of white lead, zinc white and barytes, retain their color permanently even in dark places.'

Q. Do you agree with that statement?

A. Yes, sir.

Q. Does this statement agree with your own experience in practical tests and experiments?

A. Yes, sir.

Q. I will ask you to look at page 1103 of the same official publication and first state what material is referred to in the sentence beginning with 'the introduction of this material into paint.'

A. This refers to the material barytes.

Q. Now, please read the passage beginning with the words heretofore quoted.

A. 'With the introduction of this material into paint, the question at once arose as to whether or not its presence was objectionable, or otherwise than in increasing the weight or the volume of the paint, according to the way in which it is sold. In a great many of the paints now on the market, more or less of this article is used. The barytes, which makes a white pigment, will mix by itself readily with linseed oil and make a paint that covers a surface *smoothly and evenly* and that wears probably even better than a white lead. Combined with white lead, although it increases the weight, it makes in the end *a better pigment in many respects* than white lead alone, and if the

white lead is *sold by volume* instead of weight, there can be *no objection* whatever to the barytes being mixed with it.'

Q. Does this statement accord with your opinion and experience?

A. Yes, sir.

Q. How is mixed paint sold in cans to the consumer, by volume or by weight?

A. *Always by volume.*

Q. Have you used a combination of lead, zinc and barytes?

A. Yes, sir.

Q. With what effect?

A. When I was a student I had many arguments with my father, who was a very practical man, on the subject of the newer pigments, particularly zinc oxide and barytes; and in 1882 I asked him to permit me to make an experiment to consist of one-third lead, one-third zinc and one-third barytes, which I thought would outwear either zinc or lead. He permitted me to do so, and the building which is known as No. 35 Bowery, in New York, which my brother and I still own, was painted for a distance of 180 feet of the gable wall about 100 feet above the ground—it is a high building—and my brother and I have purposely allowed this sign to remain, which is now 24 years, exposed to the salt air of the New York City climate, and is *still to-day in fairly good condition.* That was my first practical experiment in this combination." (Trans., 369-371; Rec., 641-644.)

Barytes mixes readily with linseed oil. It makes a paint that covers a surface smoothly and evenly. It works well under the brush.

The volume of the U. S. Geological Survey above referred to, p. 1102, says:

> "The barytes, which makes a white pigment, will mix by itself readily with linseed oil and make a paint that covers a surface *smoothly* and *evenly*." (Trans., 370; Rec., 643.)

Mr. Toch testified:

> "Q. Professor Ladd further states that barytes used in mixed paint is gritty, has a tendency to run, to cut in the paint as it runs when it is put on the side of a building, and he further states about barytes, that it is heavy like sand and runs down and don't combine with the oil and produces a streaky or running or gritty appearance. Does this statement accord with your experience, Mr. Toch?
>
> A. No, sir.
>
> Q. Does any part of this statement find indorsement in your experience?
>
> A. Not a single word.
>
> Q. Have you made numerous tests as to the working qualities of mixed paint containing barytes as one of its pigments?
>
> A. Yes, sir.
>
> Q. So that what you say is not based upon theory or book knowledge, but upon your actual knowledge and the evidence of your senses?
>
> A. Based upon my actual knowledge of the application of such paints.
>
> Q. In isolated instances or in numerous instances?
>
> A. Very numerous instances." (Trans., 369; Rec., 641.)

Mr. Lane testified:

"Q. Have you made many practical tests of the working qualities of mixed paint containing barytes?

A. Yes, sir.

Q. Only occasional tests or numerous ones?

A. Numerous ones.

Q. How numerous?

A. Well, I have probably done fifteen to twenty thousand in the last ten years.

Q. Did you ever find that mixed paint containing barytes, whether in small or considerable quantities, has a tendency to be gritty or that it tended to run or cut in the paint as it runs when the paint is put on the side of a building, that the barytes is heavy like sand and runs down and produces a streaky or running or gritty appearance?

A. No, sir.

Q. What has been your experience with mixed paint containing barytes?

A. My experience has been that a good grade of barytes used in mixed paint in any proportion will dry with a smooth surface without running or sagging, has no granular or grainy appearance, and, as far as cutting is concerned, I don't understand that term; therefore I don't know anything about it.

Q. You never noticed anything that you could conceive of being properly called cutting in the paint?

A. No, sir." (Trans., 407, 408; Rec., 705, 706.)

"Q. Have you ever found barytes in paint to work what the painter calls slimy or livery or streaky?

A. No, sir; it is the very opposite.

* * * * *

Q. Have you ever made a test of the working quality of a paint containing nothing but barytes and linseed oil?

A. Yes, sir, I described that in my last testimony.

Q. And how did it work?

* * * * *

A. It worked very freely under the brush, flowed out nicely, had a very fine tooth, and it was the direct opposite to being slimy.

Q. How about being livery?

A. There was no indication of any livery substance present.

Q. How about being streaky?

A. It wasn't streaky.

Q. Was it gritty?

A. No, sir.

Q. Did it sag?

A. No, sir.

Q. Did it run?

A. No, sir.

Q. Did it cut?

A. I didn't see it cut anything." (Trans., 409; Rec., 708, 709.)

Mr. Joystad testified:

"Q. So there is no difficulty in brushing that arises from the presence of barytes in paste paint after it is thinned with linseed oil?

A. If it is made properly.

Q. If it is made properly there would be no difficulty in it?

A. There would be no difficulty in it that I know of." (Trans., 326; Rec., 566-7.)

Hundreds of actual tests have absolutely demonstrated the fallacy of Prof. Ladd's "theory" that chemical combination between a pigment and linseed oil is of advantage in making the paint film elastic and in preventing settling, sagging or running out, but that on the contrary a film produced by barytes and linseed oil which do not chemically com-

bine is much more elastic and weather-resisting than a film produced by white lead and linseed oil which do combine chemically.

Mr. Toch testified:

"Q. Please state whether chemical combination between the pigment and the linseed oil is required to prevent the pigment from settling or sagging or running out?

A. No, sir.

Q. Has chemical combination anything to do with that question at all?

A. Absolutely not.

Q. In his cross-examination, Professor Ladd stated that he should not expect a combination between barytes and linseed oil to be as elastic as a combination between carbonate of lead and linseed oil, and that he should expect a combination between barytes and linseed oil to crack more readily than a combination between carbonate of lead and linseed oil. What is your experience upon this question?

A. Well, I know that it is exactly the opposite, that a film produced by means of barytes and linseed oil is much more elastic and weather-resisting than a film of paint produced by mixing white lead and linseed oil.

Q. Can you give an idea about how many tests and experiments you base this opinion upon?

A. That would be very difficult to say; I suppose my entire paint tests would be equal to at least 1,000 a year, at least.

Q. Then the practical tests and experiments upon which you have based this statement that a combination of barytes and linseed oil is more elastic and has less tendency to break than a combination of lead and linseed oil would count not by tens but by hundreds, would they?

A. Yes, sir." (Trans., 374; Rec., 649, 650.)

Mr. Lane testified:

"Q. Prof. Ladd, on his examination, stated that a combination between barytes and linseed oil would not be as elastic and would be more ready to crack than a combination between carbonate of lead and linseed oil. What is your judgment on this question?

A. The professor is mistaken; it is the other way around. Barytes and linseed oil would be the more elastic and would not crack as readily as the carbonate of lead." (Trans., 408; Rec., 707.)

3. As to Silica in Particular.

An addition of silica to the statutory pigments adds useful qualities to the paint. It may be used to the extent of one-third of the total white pigment.

Mr. Toch testified:

"Q. What percentage of silica would you regard as being useful without detracting from other useful qualities in a mixed paint containing carbonate of lead and oxide of zinc?

A. I should say up to one-third." (Trans., 116; Rec., 190.)

Silica has great protective value because of the fineness of its particles and the high degree of its oil-taking property. It works smoothly and evenly.

Mr. Lane testified:

"Q. Does silica have a tendency to run or sag or present any other objectionable quality when used as a pigment in mixed paint?

A. No, sir.

Q. Compare the oil taking qualities of silica and carbonate of lead.

A. The grade of silica that I am most acquainted with takes a trifle over three times as much linseed oil as a good grade of carbonate of lead.

Q. Do you find a high degree of oil taking property to be a valuable quality?

A. Yes, sir.

Q. In what regard?

A. If it carries a high percentage of oil it must necessarily be a very fine pigment, the particles must of necessity be very small, with the result that we get more particles on a given surface when we use it as a paint, making a better protection for the oil, and as the oil is a very necessary ingredient in the preparation of a mixed paint, we increase our oil carrying qualities of a mixed paint in the ratio in which we add the silica, as compared with carbonate of lead, and in that respect it resembles and is close to oxide of zinc; a good grade of oxide of zinc, the statutory zinc, for instance, carries about the same amount of linseed oil as the silica which I am describing, and that is a very excellent quality." (Trans., 408; Rec., 707.)

Mr. Joystad testified:

"Q. You know that silica has great permanency, don't you?

A. Yes, and it is a good filler." (Trans., 327; Rec., 569.)

Silica is very largely used as an ingredient of paint. But it is not an adulterant.

Mr. Toch testified:

"Q. Silica, of course, is a very cheap article?

A. No, sir.

Q. It is, as you have already stated, however, one of the most commonly used of all adulterants by paint manufacturers who want to manufacture a cheap quality of paint?

A. I beg pardon; I have never said anything of the kind. I never stigmatized it as an adulterant in all my testimony.

Q. You never have?

A. No, sir.

Q. And if any other witness has testified that silica is one of the most commonly used of all the ingredients in the making up of paint you would not agree with their conclusion, would you?

A. Well, that is a different question.

Q. Well, then, tell me if you agree with their conclusion?

A. I would agree with any man that said silica was very largely used.

Q. You wouldn't agree with any witness who told us that it is very largely used as an adulterant?

A. No, sir." (Trans., 396, 397; Rec., 687.)

4. As to the Question of Adulteration.

"Adulteration," as applied to paint and as distinguished from misbranding or mislabeling paint, is the use, for the purpose of cheapening the paint, of an ingredient which has no value in paint or the use of a useful ingredient beyond the extent to which it adds useful qualities to paint.

Professor Ladd testified:

"Q. Then do I understand you correctly as meaning that the adulteration begins at the point where the proper percentage of a pigment is exceeded, where there is an excess of the percentage of a pigment beyond that which serves a useful purpose?

A. If it has no value, adds no value, yes.

Q. Excess beyond the percentage which

serves a useful purpose certainly has no value, has it?

A. No, it has no value if it is beyond the percentage, no, sir." (Trans., 277; Rec., 485.)

Mr. Joystad testified:

"Q. Well, if something is used for the purpose of cheapening and not for the purpose of making the paint better, you would call that adulteration unless it is put on the can?

A. Yes, that is true.

Q. You would call it an adulteration, then?

A. Yes." (Trans., 317; Rec., 552.)

Mr. Lane testified:

"Q. When you speak of adulteration, do I understand you correctly as meaning that when an article which has useful qualities is used in a greater percentage than is justified by the legitimate purpose for which that article may be used, as to that excess there is an adulteration?

A. That covers the term 'adulteration,' as I understand it, irrespective of what it is.

Q. Has that anything to do with price?

A. No, sir.

Q. Then when you speak of adulteration, you mean the addition of something which detracts from useful qualities?

A. That is adulteration.

Q. Anything which impairs the proper quality is, then, in your opinion, an adulteration, is it?

A. Yes, sir. Going further, if you put in too much linseed oil, which we all recognize as being a very excellent article. that, in my opinion, is an adulteration." (Trans., 196-7; Rec., 334-5.)

Prof. Ladd testified:

"Q. If a mixed paint manufacturer would put into his mixed paint can more linseed oil than is necessary to give the proper degree of

consistence, that excess would be an adulteration, would it not?

A. I would consider it so, yes, sir.

Q. You would be aided in that determination by the fact that linseed oil in mixed paint which is sold by the bulk and not by weight is cheaper, measured in bulk, than carbonate of lead or oxide of zinc?

A. Yes, sir." (Trans., 277; Rec., 485, 486.)

Mr. Lane testified:

"Q. You can add bulk to your paint easily with linseed oil, can you not?

A. Oh, yes.

Q. And when paint is used by the gallon, then a surplus of linseed oil would be to that extent, as to that excess, an adulteration, would it not?

A. Yes, sir, and in reality a fraud, selling linseed oil as mixed paint and demanding mixed paint price for it.

Q. Linseed oil is very much cheaper than good grades of mixed paint?

A. Oh, yes." (Trans., 197; Rec., 335.)

Oxide of zinc for use in outside paint serves no useful purpose in any case, if it forms more than fifty per cent. of the white pigment body. If used in excess of this percentage, it is used as an adulterant.

Professor Ladd testified:

"Q. Now, up to what degree, up to what percentage, would you think the addition of zinc to carbonate of lead is serving a useful purpose?

A. You mean for exterior whites or for all paints?

Q. Take exterior whites first.

A. Well, I should say that very much above

one-half zinc oxide would detract from its value, in my judgment.

Q. Well, and it being considerably cheaper than carbonate of lead, it would in that case be an adulterant, would it not?

A. It would be added probably for the purpose of cheapening the paint.

Q. And therefore you would call it an adulteration?

A. In my mind, yes, sir.

Q. Well, wouldn't you so express it also?

A. I certainly should." (Trans., 278; Rec., 486, 487.)

Mr. Cook testified:

"Q. What would you say about a combination of 50 per cent. of oxide of zinc with 50 per cent. of carbonate of lead?

A. I would say it was all right.

Q. What would you say about a combination of 60 per cent. of oxide of zinc with 40 per cent. of carbonate of lead?

A. I wouldn't want any more.

Q. What would be the effect of using more than 50?

A. Well, it would be apt to crack and peel." (Trans., 347; Rec., 604.)

Mr. Lane testified:

"Q. I understood you to say that up to a certain percentage, oxide of zinc may be used in a mixture with carbonate of lead and will improve the quality of the paint, is that correct?

A. Yes, sir, that is correct.

Q. Therefore, in spite of the fact that a lower priced article is mixed with a higher priced article, still that admixture produces a better effect than the use of the higher priced article alone?

A. In that case, yes, sir.

Q. If more than the proper amount of oxide

of zinc is added to carbonate of lead, that surplus does not add any useful quality to the paint, does it?

A. No, sir, and it is an adulteration, in my opinion." (Trans., 196; Rec., 334.)

Mr. Joystad testified:

"Q. If the proper proportion for the best results is fifty per cent. of carbonate of lead and fifty per cent. of oxide of zinc, then if any paint manufacturer should put, say, seventy per cent. of oxide of zinc into his paint, with thirty per cent. of carbonate of lead, what reason would he have for that?

A. Well, it looks like he is—

Q. Trying to cheat?

A. Trying to cheapen it, and I don't think he would make nearly as good paint." (Trans., 316; Rec., 551-2.)

The use of oxide of zinc in excess of its limit of usefulness, and hence as an adulterant, is a common practice.

Mr. Lane testified:

"Q. Isn't it a fact that oxide of zinc is largely used to adulterate in combination with carbonate of lead, reducing the amount of carbonate of lead and substituting therefor oxide of zinc in mixed white paints?

A. Yes, that is a common practice." (Trans., 210; Rec., 359.)

Among the 24 samples of mixed paints, the analyses of which are reported in Prof. Ladd's Bulletin (Trans., 58-71), 10 samples show the use of oxide of zinc in excess of 50 per cent., while only 9 samples show the use of Class B pigments in excess of 33 per cent.

The following ten samples show oxide of zinc used in excess of 50 per cent.:

Sample No. 38 (Trans., 60)	80.45%
Sample No. 39 (Trans., 61)	56.64%
Sample No. 40 (Trans., 62)	65.81%
Sample No. 41 (Trans., 62)	68.14%
Sample No. 42 (Trans., 63)	54.25%
Sample No. 49 (Trans., 65)	53.00%
Sample No. 57 (Trans., 66)	60.94%
Sample No. 62 (Trans., 68)	99.80%
Sample No. 63 (Trans., 69)	56.75%
Sample No. 71 (Trans., 71)	56.09%

The following nine samples are the *only* ones showing Class B pigments used in excess of 33 per cent.:

Sample No. 8 (Trans., 59):

Calcium Carbonate	34.93%
Barium Sulphate *and color*	26.31%
Total	61.24%

Sample No. 9 (Trans., 59):

Calcium Carbonate	11.54%
Gypsum	40.62%
Silica	1.13%
Total	53.29%

Sample No. 48 (Trans., 64):

Calcium Carbonate	26.84%
Barytes	23.10%
Total	49.94%

Sample No. 49 (Trans., 65):

Calcium Carbonate	45.90%
Magnesium Carbonate	1.01%
Total	46.91%

Sample No. 53 (Trans., 65):

Barium Sulphate	Total 41.99%

Sample No. 55 (Trans., 66):

Calcium Carbonate	29.23%
Barium Sulphate	13.64%
Total	42.87%

Sample No. 56 (Trans., 66):

Calcium Carbonate	28.44%
Barium Sulphate	9.18%
Total	37.62%

Sample No. 57 (Trans., 66):

Barytes	33.32%
Silica	1.18%
Total	34.50%

Sample No. 67 (Trans., 70):

Barium Sulphate	8.55%
Calcium Carbonate	28.45%
Magnesium Carbonate	3.15%
Silica	.98%
Total	41.13%

BRIEF OF THE ARGUMENT.

DIVISION 2.

BRIEF OF THE POINTS OF LAW.

Corporations are persons within the provisions of the 14th amendment.

Gulf, C. & S. F. R. Co. v. *Ellis*, 165 U. S., 150, 154.

The classification, though ostensibly between paints, is in reality between paint manufacturers.

Connolly v. *Union Sewer Pipe Co.*, 184 U. S., 540.

The exercise of the police power must be reasonable. The question of the reasonableness of a state statute ostensibly passed in the exercise of the police power is a judicial question.

Mugler v. *Kansas*, 123 U. S., 623, 661.

Lake Shore & M. S. R. Co. v. *Ohio*, 173 U. S., 285, 301.

Wisconsin, M. & P. R. Co. v. *Jacobson*, 179 U. S., 287, 301.

Dobbins v. *Los Angeles*, 195 U. S., 223, 235, 237, 239.

Lawton v. *Steele*, 152 U. S., 133, 137.

Holden v. *Hardy*, 169 U. S., 366, 395.

Gulf, C. & S. F. R. Co. v. *Ellis*, 165 U. S., 150, 155.

Lochner v. *New York,* 198 U. S., 45.

Chicago, B. & Q. R. Co. v. *Illinois,* 200 U. S., 561, 592-3.

Lake Shore & M. S. R. Co. v. *Smith,* 173 U. S., 684.

Long v. *Maryland,* 74 Md., 565.

While every intendment is to be made in favor of the lawfulness of the exercise of this power, the courts will not imagine the existence of some undisclosed and unknown reason for its exercise. The simple decision of the legislature cannot be held to constitute such reason.

Lake Shore & M. S. R. Co. v. *Smith,* 173 U. S., 684, 689.

Dobbins v. *Los Angeles,* 195 U. S., 223, 237-8.

Gulf, C. & S. F. R. Co. v. *Ellis,* 165 U. S., 150, 154.

Lochner v. *New York,* 198 U. S., 45, 56, 57.

A statute ostensibly passed in the exercise of the police power must be judged by its natural effect and not by its proclaimed purpose.

Lochner v. *New York,* 198 U. S., 45, 64.

Mugler v. *Kansas,* 123 U. S., 623, 661.

C., B. & Q. R. Co. v. *Illinois,* 200 U. S., 561, 593.

A statute which restrains the liberty or property rights of individuals, though ostensibly passed in the exercise of the police power, cannot be held valid, unless it has a real or substantial relation to some legitimate object of the police power which its provisions reasonably tend to accomplish.

Mugler v. *Kansas*, 123 U. S., 623, 661.
C., B. & Q. R. Co. v. *Illinois*, 200 U. S., 561, 592-3.
Lochner v. *New York*, 198 U. S., 45, 64.
Gulf, C. & S. F. R. Co., 165 U. S., 150.

Even if a statute is fairly referable to the police power of the state, still if it impairs or destroys a right secured by the federal constitution, it is invalid.

Connolly v. *Union Sewer Pipe Co.*, 184 U. S., 540, 558.

It is conceded that, in making regulations, providing penalties or imposing liabilities in the exercise of the police power, the legislature has the right to make classifications. But classification must have some reasonable basis. The differences which will support class legislation must be such as in the nature of things furnish a reason for separate laws. The differences must bear a reasonable relation to the purpose of the statute. Arbitrary designation or selection is not classification. When burdens are placed upon some and not upon others similarly situated with respect to the purpose for which such burdens are im-

posed, the classification is arbitrary and illegal.

Soon Hing v. *Crowley,* 113 U. S., 703, 709.
Barbier v. *Connolly,* 113 U. S., 27.
Gulf, C. & S. F. R. Co. v. *Ellis,* 165 U. S., 150.
Cotting v. *Kansas City St. Yds. Co.,* 183 U. S., 79.
Connolly v. *Union Sewer Pipe Co.,* 184 U S., 540.
Luman v. *Hitchins Bros. Co.,* 90 Md., 14.
Missouri v. *Ashbrook,* 154 Mo., 375.
State v. *Julow,* 129 Mo., 163.
Bailey v. *The People,* 190 Ill., 28.

The liberty guaranteed by the 14th amendment embraces the right of the citizen to be free in the enjoyment of all his faculties; to be free to use them in all lawful ways.

Allgeyer v. *Louisiana,* 165 U. S., 578.

To enjoy the privilege of pursuing an ordinary calling or trade upon terms of equality with all others in similar circumstances, is an essential part of the rights of liberty and property as guaranteed by the 14th amendment.

Powell v. *Pennsylvania,* 127 U. S., 678, 684.
People v. *Hawkins,* 157 N. Y., 1.
Bailey v. *People,* 190 Ill., 28, 35.

Any law which without a valid reason annihilates the value of property, restricts its use or takes away any of its essential attri-

butes by imposing onerous conditions upon the right to hold or sell it, deprives its owner of property without due process of law.

People v. *Hawkins,* 157 N. Y., 1.

To require a label upon some mixed paints while exempting others, is not only to burden them with peculiar expense, but also to require them to bear a badge of inferiority which diminishes their value and impairs their selling qualities.

People v. *Hawkins,* 157 N. Y., 1.

To restrict one's freedom of competition upon equal terms with others in the same business is prohibition.

Brimmer v. *Rebmann,* 138 U. S., 78.

The 14th amendment forbids that any impediment be interposed by a state statute to the pursuits of any one except as applied to the same pursuits by others standing in the same relation to the purpose of the statute.

Barbier v. *Connolly,* 113 U. S., 27.

Soon Hing v. *Crowley,* 113 U. S., 703.

Connolly v. *Union Sewer Pipe Co.,* 184 U. S., 540.

Gulf, C. & S. F. R. Co. v. *Ellis,* 165 U. S., 150.

Cotting v. *Kansas City St. Yds. Co.,* 183 U. S., 79.

It is not necessary that the character of the discrimination or the attendant circumstances should justify an inference of malice, ill will or corrupt favoritism on the part of the legislature, to condemn class legislation. It is enough that no rational basis for the discrimination can be discerned.

Smyth v. *Ames,* 169 U. S., 466.

Cotting v. *Kansas City Stock Yds. Co.,* 183 U. S., 79 (112).

Classification must rest upon naturally existing distinctions. The legislature may not create classes by its fiat.

Missouri v. *Ashbrook,* 154 Mo., 375.

State v. *Julow,* 129 Mo., 163.

The 14th amendment is violated when there is no fair reason for a statute that would not require with equal force its extension to others whom it leaves untouched.

Missouri, K. & T. R. Co. v. *May,* 194 U. S., 267, 269.

Where the enforcement of an unconstitutional law or ordinance would lead to a multiplicity of suits or destroy property rights, injunction to restrain its enforcement is the proper remedy.

Smyth v. *Ames,* 169 U. S., 466, 517.

Cleveland v. *Cleveland City R. Co.,* 194 U. S., 517.

Detroit v. *Detroit Citizens' St. R. Co.,* 184 U. S., 368.

Dobbins v. *Los Angeles,* 195 U. S., 223.

PART IV.

THE ARGUMENT.

A. The Unreasonableness of the Discrimination against the Class A Pigments.

The testimony establishes without contradiction that neither of the statutory pigments, if used singly, is capable of furnishing to mixed paint all the desirable qualities which the white pigment body is relied upon to give to paint.

While carbonate of lead has great opacity and good initial whiteness, and while the globular variety of this pigment works exceedingly well under the brush, it is an easily decomposable body. A paint of which carbonate of lead forms the sole white pigment, rapidly goes to pieces under the influence of rain, moisture and other atmospheric conditions. It "chalks" or "flours." It turns yellow in interior work and tends to turn black when exposed to the influence of certain gases, particularly sulphur gases. It leaves a bad surface for repainting. Carbonate of lead also tends to settle and harden in the can, and the crystalline variety of this pigment works badly under the brush. There are many paints in which carbonate of lead is totally unfit for use.

While oxide of zinc has fine initial whiteness as well as permanence of color and works pretty well under the brush, it lacks durability and is deficient in opacity. It also is an easily decomposable body.

Rain and moisture disintegrate it. It dries hard and brittle. A paint of which oxide of zinc is the sole white pigment "cracks" and "peels" and quickly goes to pieces, leaving a bad surface for re painting.

The conclusion is irresistible that Doctor Dudley did not overstate the case when he characterized both statutory pigments as "distinctly inferior" and as "inherently defective and bad".

The testimony further establishes that even a combination of the two statutory pigments, no matter in what proportions they are combined, falls short in that most important quality of paint: durability. The combination is further defective in other important respects as hereinabove shown.

Far be it from us, however, to contend that on account of these defects the statutory pigments should be condemned as unfit for use in paint. To be convinced that neither, if used as the sole white pigment, nor any combination of these two, unaided by other white pigments, is capable of giving complete satisfaction, does not argue that a thoroughly satisfactory and efficient mixed paint cannot be produced by using one or another or both of the statutory pigments in combination with one or more of the Class A or Class B pigments. The reverse is true. All we contend is that the various pigments of Class A and Class B should be judged in the same way. We contend that a pigment of Class A or Class B should not be condemned because, if used as the sole white pigment, it is incapable of imparting to paint *all* the qualities which the white pigment body is expected to furnish. If such a test were to be applied

to either of the statutory pigments, they would have to be condemned unhesitatingly. In judging any white pigment, including the pigments of Class A and B, the test must rather be: Is it, if used in combination with other white pigments, capable of performing a useful function in mixed paint? Does it add to its valuable qualities? Is it capable of increasing its efficiency?

The answer of the defendant admits that formerly carbonate of lead was the only material universally conceded to be a proper white pigment, and that only within the last thirty years has oxide of zinc come to be conceded to possess important, useful qualities as a white pigment not possessed by carbonate of lead. This is an eloquent admission that better paint is made when oxide of zinc is added to carbonate of lead than was formerly made, when carbonate of lead was the only opaque white pigment used. The great whiteness of oxide of zinc, its permanence of color and its freedom from liability to chalk or flour, make it useful as a pigment to be used in combination with carbonate of lead, although its deficiency in opacity, its liability to crack and peel, and other defects utterly prevent it from giving satisfaction, if used as the only white pigment in paint. We thus have an established precedent for the extension of the range of materials properly usable as opaque white pigments, a precedent recognized by the statute under consideration in spite of the shortcomings of oxide of zinc.

Since the time when oxide of zinc gained this recognition, the technology of paint manufacture has made rapid strides. The inherent defectiveness

of both carbonate of lead and oxide of zinc, as well as of any combination between these two pigments, was an incentive to the students of the problem to find other opaque white pigments, to be used instead of the former or in combination therewith, which should have the effect of overcoming the defects of the former and increasing the efficiency of paint. Thus the range of opaque white pigments was widened by the introduction of sublimed lead, zinc lead white, lithophone and zinc from Western ores carrying sulphate of lead, forming the group of what we have called the Class A pigments. Just as oxide of zinc had to fight for thirty years to gain recognition, so these Class A pigments have had to fight for recognition against the carbonate of lead trust and the oxide of zinc monopoly. Today every enlightened paint manufacturer recognizes their merits. That they have great merits and that as good paint cannot be made by excluding them as can be made by using them, the evidence leaves no room for doubt. The defense made desperate efforts, though with indifferent success, to show that each one of the Class A pigments has some defects; that each one, if used as the sole white pigment, would fall short of imparting to mixed paint all the good qualities to be furnished by the white pigment body. If this had been fully established it would furnish no better reason for excluding Class A pigments than the vastly greater shortcomings of either of the statutory pigments furnishes for excluding the latter.

While the bill enumerates four Class A pigments which "according to circumstances, are as efficient as, and in some respects more efficient than, carbo-

nate of lead or oxide of zinc or a combination of the two for the purposes for which the latter are used in paint," our complaint against the statute would be equally valid, whether we have established our contentions as to one or as to all four of the Class A pigments. If *e. g.*, the evidence clearly establishes our contentions only as to sublimed white lead, then the branding of that pigment as an adulterant, the prohibition of its use in paint except upon onerous conditions, would stamp the statute as unreasonable, as an unjustifiable invasion of the right of private property. If the evidence establishes the allegations of sub-paragraph a of paragraph 17 of the bill not only as to sublimed lead, but also as to all other Class A pigments, the case is thereby not made stronger in principle, but is proven four times instead of once.

To consider in detail, in this connection, the qualities of *each* of the four Class A pigments separately would therefore be as unnecessary as it would be bewildering. Suffice it to say that the evidence referred to and quoted in the Brief of the Argument clearly establishes our contentions as to all the Class A pigments. They are even admitted by the answer as respects zinc from Western ores containing not to exceed five per cent. of sulphate of lead. But for the purpose of illustrating our contentions, we shall take up in detail the qualities of *one* of the Class A pigments. We have selected sublimed lead as the pigment to be specially considered because in the taking of the testimony, the batteries of the defense were specially trained against that pigment.

We find that Professor Ladd, the chief champion

of the North Dakota Statute, in his Bulletin, places sublimed lead above carbonate of lead in the two most important qualities of an opaque white pigment: durability and hiding power. He likewise places it ahead of carbonate of lead in the qualities of initial whiteness, permanence of whiteness and fineness of the particles, which latter quality has to do with the smooth and even working of the paint. He also emphasizes the fact that sublimed lead is non-poisonous, whereas carbonate of lead is known to be one of the deadliest of poisons. While this last difference has nothing to do with the quality of paint, it might well excuse a legislative discrimination against carbonate of lead as a regulation in the interests of health, such as we find in France and Germany. But it is passing strange that the legislature of North Dakota has discriminated in favor of the deadly poisonous carbonate of lead and against the non-poisonous sublimed lead, which latter was conceded by the chemist of the North Dakota Agricultural College in a bulletin published a few days before the filing of our bill, to be superior to carbonate of lead in the all-important qualities above mentioned.

In view of these admissions of Professor Ladd, it is almost superfluous to refer to the unqualified endorsements of sublimed lead by Doctor Dudley, Mr. Toch and Mr. Lane.

And what are the charges brought by Professor Ladd against sublimed lead? That it is variable in composition; that it does not work smoothly under the brush; that it hardens in the can. These and none other. The other two witnesses, Messrs. Joy-

stad and Cook, have hardly a speaking acquaintance with this pigment.

We have shown in our Brief of the Argument that variability of composition might inconvenience the manufacturer, but is no objection from the standpoint of the user of the finished product; that the charge of variableness in composition of sublimed lead is based upon an English paint chemist's analysis of two samples of sublimed lead manufactured at least fifteen years ago; that American sublimed lead has been practically uniform in composition during the last fifteen years; that if variability of composition were a valid objection to a pigment from the standpoint of the efficiency of the manufactured paint, carbonate of lead, sanctioned by the statute, is the most variable of all.

We have shown in our Brief of the Argument that the charge that sublimed lead does not work smoothly under the brush is based upon nothing but third-hand hearsay evidence, and is disproved by numberless actual brushing tests.

We have shown in our Brief of the Argument that sublimed lead does not tend to harden in the can, and that carbonate of lead, sanctioned by the statute, is, among all white pigments, the worst offender in this respect.

If all of these objections which are urged by the defense were well established, it would only argue that sublimed lead, *if used as the sole white pigment,* would fall short of giving complete satisfaction. This is beside the point, because each of the statutory pigments, *if used as the sole white pigment,* falls short—yes, far more short than sublimed

lead—of giving complete satisfaction. But the fact is that none of the objections to sublimed lead was established by the evidence.

Thus it becomes a conclusion removed from the field of honest argument that, as one of the witnesses expressed it, sublimed lead is the best white pigment in the American market. It is the only white pigment which, if used singly, is capable of furnishing to white and light shades of paint, all the desirable qualities which the white pigment body is expected to furnish.

Nor does the evidence leave room for the slightest doubt that each of the other three Class A pigments is a highly useful and efficient white pigment, being of equal value with one or another of the statutory pigments in some cases, and of superior value in others, and that the valid objections to each are of lesser importance than the valid objections to either of the statutory pigments.

Let it be remembered that the answer of the defendant does not charge, nor is there any evidence to show, that any of the Class A pigments is ever used for the purpose of cheapening or adulterating paint. This charge is made only as to the Class B pigments.

The only possible ground for the discrimination against the Class A pigments is, therefore, that by reason of their comparatively recent introduction, their value and usefulness are not as yet universally conceded by paint manufacturers.

The answer avers, *upon information and belief*, that about one-half of the one hundred leading paint

manufacturers in the United States are not convinced of the usefulness, value or efficiency of sublimed white lead, zinc lead white or lithophone and entirely reject them. This averment, as hereinbefore shown, is not supported by any proof. It rests upon nothing except a statement by Mr. Toch that he *knows* that one-half of the leading manufacturers use Class A pigments, but *does not pretend to know* what the others use.

The answer further avers, *upon information and belief,* that "some" of the manufacturers who are alleged to reject these pigments so reject them because tests made by them have proven them to be unsatisfactory and inefficient, the others rejecting them because a sufficient time has not yet elapsed since their introduction within which to properly test, determine and demonstrate their value.

That sufficient time has not yet elapsed since their introduction to properly test, determine and demonstrate the value of the Class A pigments is manifestly untrue. They have all been in the market twenty years or more. The very averment of the answer is an admission that one-half of the leading paint manufacturers of the country have become convinced of their usefulness, value and efficiency. The evidence shows affirmatively in a general way that every enlightened paint manufacturer knows that the availability of the Class A pigments permits of the making of better paint than can be made by using either or both of the statutory pigments exclusively. The evidence shows as to sublimed lead in particular that seventy-eight of the leading paint manufacturers of the country use this pig-

ment. They can have no motive in using it except to improve their product, as it is just as expensive as carbonate of lead in the East, only one quarter of one cent per pound cheaper than carbonate of lead in the West (freight rates causing this difference), and three quarters of a cent per pound more expensive than oxide of zinc.

The averment of the answer that "some" manufacturers reject the Class A pigments because tests made by them have proven them to be unsatisfactory and inefficient has nothing to support it except the testimony of the witnesses Joystad and Cook that the two manufacturers by whom they are employed, respectively, do not use Class A pigments except zinc from Western ores. As to the ignorance, not to say illiteracy of these witnesses, as to their lack of competency to form a reliable judgment, as to the superficiality of their pretended tests (Mr. Cook admits that he never tested any of them except zinc from Western ores), and as to the extreme conservatism of their respective employers, we beg to refer to the detailed statement of their qualifications. (pp. 59 *et seq., supra.*) The fact undoubtedly is that the attitude of the employers of Messrs. Joystad and Cook and the attitude of all other manufacturers who do not use Class A pigments is aptly described by Mr. Cook when, speaking of his employer and himself, he said: "We never have tried anything else, only the carbonate of lead and oxide of zinc." Again he says: "We think that we have got along as well using what we have, that *we haven't dared to risk anything else without a good deal of experimenting, which we*

haven't done." And on cross-examination: "Q. In other words, you did act upon the principle of letting well enough alone? A. Yes, sir. Q. You were making a paint that found a ready sale and you thought it was satisfactory paint and *you didn't try to improve it?* A. No. Well, *I wasn't allowed to try. I often would, but I wasn't allowed to.* Q. Mr. Ramsey stood in the way? A. Yes, sir. Q. *He is still more conservative than you are,* is he? A. Yes, sir. *He didn't want me to fool away my time with it.*"

The true situation as shown by the record is, not that there is a considerable number of competent manufacturers who have fairly tested the Class A pigments and found them less efficient or more objectionable than the statutory pigments or wholly bad, but that there is on the one hand a majority of paint manufacturers, among them the complainants in this case, who are wide-awake, alert, progressive, enterprising and inquiring, who employ skilled chemists, who maintain experiment stations, who constantly make tests, who have thoroughly investigated these newer pigments and found that by using them they have improved their product, and, on the other hand, a minority who are slow, dull, conservative, easily satisfied and intellectually lazy, who do not employ chemists, who are too timid to spend energy and money on practical tests or experiments, who therefore have not investigated or not fairly tested these newer pigments and reject them, not because they know them to be bad, but because they have not given themselves a chance to find out how good they are, how much

better paint can be made by using them than by using the statutory pigments alone. The situation is exactly the same as it was during the period from fifty to thirty years ago, during which the number of manufacturers who foolishly clung to carbonate of lead alone and rejected oxide of zinc without investigating it, gradually dwindled down.

The actual experience of the enlightened manufacturers has demonstrated with mathematical precision that the Class A pigments are, according to circumstances, equally as valuable and efficient as the statutory pigments for some purposes of mixed paint, and more valuable and efficient for other purposes of mixed paint. To say that because the unprogressive manufacturers have not yet found this out, therefore the progressive manufacturer who uses Class A pigments may be branded as an adulterator and subjected to prejudices and financial burdens not imposed upon his unprogressive competitor who clings to the antiquated prejudice in favor of the statutory pigments, is to place a premium upon darkness against light, upon superstition against truth, upon ignorance against knowledge, upon stagnation against progression, upon reaction against reform, upon mediocrity against excellence.

In fact, this statute might aptly have been styled "An Act to reward old-fogyism and to punish the application of modern scientific discoveries in the manufacture of mixed paint."

That all of the Class A pigments are newer than the statutory pigments is freely admitted. Carbonate of lead was used as a paint pigment two thou-

sand years ago. Oxide of zinc began to be used fifty years ago. None of the Class A pigments is much older than twenty years. But the novelty of the Class A pigments is not a circumstance to *the novelty of the doctrine that merely the comparative newness of a commercial article is a constitutionally defensible reason for legislative discrimination against it.* If this doctrine were to be upheld, it would justify legislative discrimination against every useful invention which has aided man in his struggle against inimical forces of nature, which has advanced civilization or added to the sum of human happiness.

B. The Unreasonableness of the Discrimination against Class B Pigments.

We again beg to refer to the fact shown by the testimony without contradiction, that neither of the statutory pigments, if used as the sole white pigment, nor any combination of the statutory pigments, is capable of furnishing to mixed paint all the desirable qualities which the white pigment body is relied upon to furnish. In the preceding chapter we have shown how the recognition of the inherent defectiveness of the statutory pigments led to the widening of the range of opaque and color-modifying white pigments by the introduction of the Class A pigments. In the present chapter we will show how the inherent defects of the statutory pigments may be largely overcome by mixing with them one or more pigments of Class B.

The evidence establishes the following facts:

The chemical inertness of the Class B pigments makes them immune to decomposing influences and gives them great durability. Their practical indestructibility and insolubility enables them to serve the purpose of protection better than it is served by either of the statutory pigments, or any combination thereof. They are deficient, however, in opacity, and therefore serve only indifferently the purpose of hiding the surface to be covered. In white and light shades of paint wherein little or no coloring matter with hiding power is used, the necessary opacity can be given to the paint only by the white pigment body. In these cases Class B pigments, by reason of their deficient opacity, cannot be used exclusively and should not be used in excess of one-third of the entire pigment body. But in all those darker shades where the coloring matter furnishes the necessary opacity and where, therefore, the degree of opacity of the white pigment body is of no moment, the greater the percentage of Class B pigment, the better, the more durable, the more all-around efficient is the paint produced.

It is demonstrated by thousands of experiments that even in white paint, if Class B pigments are added to the statutory pigments in the proportion of one-third of Class B pigments to two-thirds of the statutory pigments, such addition on the one hand insures greater durability, the leaving of a better surface for repainting and better suspension of the pigment in the oil, and, on the other hand, detracts neither from the necessary or desirable degree of opacity nor from any other useful quality possessed by paint containing only statutory pigments.

In numerous shades of paint the use of Class B pigments is not only proper, but they must be used exclusively, because neither the statutory pigments nor the Class A pigments are fit for use by reason of their color-modifying power. That this is true, and that the mixed paints of the shades in question compose not less than 25 per cent. of all the mixed paints produced, sold and consumed in North Dakota, is admitted in paragraph 3 of the Answer of the defendant.

We have hereinabove (p. 67, *supra*) pointed out how important it is in the case of mixed paint that the pigment should not separate from the thinning vehicle and settle at the bottom of the container. Carbonate of lead is the worst offender in this regard. The addition of the proper amount of any Class B pigment (except barytes, by reason of its high specific gravity) to the statutory pigments prevents their settling in the can.

We admit that all the Class B pigments are deficient in opacity. But so is oxide of zinc.

We admit that none of the Class B pigments, if used as the sole white pigment, nor any combination of the Class B pigments, if used without the addition of statutory or Class A pigments, is capable of furnishing to white or light shades of paint all the desirable qualities which the white pigment body is relied upon to furnish. But this is equally true of the statutory pigments. The difference, however, is that while this is true of the statutory pigments in *all* cases, it is not true of the Class B pigments in the case of all colored paints wherein the coloring matter furnishes the necessary opacity. In all

these cases any one of a number of Class B pigments may be used as the sole white pigment and furnish to the paint all the qualities which the white pigment body is relied upon to furnish.

A few words about barytes in particular, because this Class B pigment was singled out for special attack by the defense. The evidence shows without contradiction that barytes is an insoluble and inert pigment of great permanency. It is a practically indestructible, stable, unchangeable chemical body, and as such an absolutely ideal pigment for the preservation of surfaces. Deficient opacity is its only shortcoming. According to the official U. S. geological survey of 1904, barytes is not an adulterant, but adds to the permanence of substance and, in case of whites, of the color of the paint. The truth of this statement is demonstrated by numberless tests and experiments. A paint film produced by barytes and linseed oil is much more elastic and weather-resisting than a film produced by carbonate of lead and linseed oil.

The above details, all of which are substantiated by the quotations from the testimony given in the Brief of the Argument hereinabove, establish the truth of the allegation of sub-paragraph b of paragraph 17 of the bill of complaint, that the Class B pigments, if used in proper proportions and under proper conditions, constitute proper and useful ingredients of paints.

Upon what grounds is their exclusion from the allowable ingredients of mixed paint attempted to be justified?

The defendant's answer avers that the chief use of Class B pigments is to cheapen and adulterate the paint wherein they are employed. This averment is absolutely disproven by the testimony. The testimony shows that their chief use is, *first*, to neutralize the inherent defects of the statutory pigments where these are used in mixed paint; to increase the durability of the paint; to decrease the tendency to chalk or flour, crack or peel; to insure the leaving of a better surface for repainting; to prevent carbonate of lead from becoming discolored, and to keep the pigment body in suspension; and, *second*, to perform the office of the white pigment body in all those cases where the statutory and Class A pigments, by reason of their color-modifying power, cannot be used at all or only to a limited extent.

The answer further avers that of all known substances and materials the Class B pigments are in their nature the best adapted and lend themselves most readily to the adulteration of, and are most commonly used as adulterants and cheapening ingredients in the preparation of mixed paints.

We admit that all of the Class B pigments are very much cheaper than the statutory or Class A pigments. For this reason alone, and not by reason of their possessing any other peculiar quality, do they hold out a temptation to the unscrupulous manufacturer to use them in excess of the limit of usefulness for the purpose of cheapening his product. But the same is true of any proper and useful ingredient which is cheaper than the highest priced. Oxide of zinc is considerably cheaper than carbon-

ate of lead. The evidence hereinabove collected (pp. 155, 6, *supra*) shows that oxide of zinc lends itself as readily to use in excess of the limit of its usefulness as the Class B pigments and that in the paints sold in North Dakota it is more often so used than the Class B pigments.

We freely admit the truth of the averment in the answer that many manufacturers, in the preparation of their mixed paints, use as ingredients great quantities of the Class B pigments, and so use them instead of carbonate of lead and oxide of zinc, which are much more expensive. That they do so is most praiseworthy, in view of the inherent defects of the statutory pigments and the fact that these defects are largely overcome by mixing Class B pigments with the statutory pigments. But the further assertion of the answer that in many cases manufacturers who thus use Class B pigments in their mixed paints, label them as "pure white lead," or "pure white lead in oil," or "pure mixed paint made of lead and oil," is *without a shadow of support in the evidence.*

The evidence shows, and we admit, that there are a great many substitutes for *white lead in oil* in the market which contain mixtures of white lead and other pigments ground in oil to paste consistency and are sold under the name of "white lead." But not a single instance has been shown where *mixed paint* containing Class B pigments was misbranded in the manner alleged by the Answer.

Now, it might be observed in passing that in every case of the misbranding of *substitutes for white lead*

in oil shown in the evidence (Trans., 58; Rec., 90), the white pigments mixed with white lead are both *oxide of zinc* and Class B pigments. But cases of misbranding substitutes for *white lead in oil* are not cases of misbranding *mixed paint.*

It should also be observed that the misbranding of *substitutes for white lead in oil* is covered by a perfectly valid and unobjectionable clause of the statute which is quite distinct from its provisions regarding *mixed paint.* White lead in oil and substitutes therefor are separately treated in the statute under consideration. The opening sentence of the statute provides that white lead paint (which means white lead in oil and is a species of paste paint, pp. 8, 9, *supra*), and compounds intended for use as such must be labeled *in all cases* so as to show the true per cent. of *each* mineral constituent contained therein. With this provision which requires the labeling of white lead in oil and compounds intended for the same use, we have no fault to find, as it does not discriminate against any pigment. If the misbranding of substitutes for white lead in oil is an evil in North Dakota not sufficiently provided against otherwise, then this independent provision of the statute takes care of it. The provisions of the statute in regard to *mixed paint* do not touch this evil of misbranding substitutes for white lead in oil. The discrimination against Class B pigments of which we complain is made solely by the provision of the statute in regard to *mixed paint.*

We repeat, that not a single instance has been shown where mixed paint containing Class B pigments was misbranded, as asserted in the An-

swer. The only complaint against the Class B pigments which finds any support in the evidence is that they are sometimes used in excess of the limit of usefulness. But in view of the fact so abundantly established by Prof. Ladd's own Bulletin, that the use of oxide of zinc in excess of the limit of usefulness is *more frequent* than such use of Class B pigments, the discrimination against Class B pigments is utterly without foundation. A manufacturer who uses oxide of zinc as the sole white pigment, or if not as the sole white pigment, uses it in excess of its usefulness to the extent of anywhere from 50 to 99 per cent. in combination with carbonate of lead, is not required to label his paint. But his competitor, who uses a combination of the statutory pigments with Class B pigments, the proportion of the latter being within the limit of usefulness, say anywhere from 1 to 33 per cent. of the white pigment body, which makes a vastly better and more durable paint than can be made from any combination of the statutory pigments alone, is subjected to the prejudice and financial burden of labeling his paint.

But even if the court should conclude that the discrimination of the statute against the Class B pigments is justified upon the ground of their lending themselves to the purpose of cheapening or adulterating paint, *let it be remembered again that no such charge is made against the Class A pigments.* The allegations of the bill in regard to the Class B pigments might be bodily stricken out, and our case against the statute, by reason of its exclusion of the Class A pigments, would lose none of its force.

C. The Unreasonableness of the Exclusion of Varnish from the List of Allowable Ingredients.

The allegations of the bill with reference to the value and importance of the use of varnish as a thinning ingredient in certain mixed paints for which there is a very large demand, are admitted by the demurrer. Wherever a high gloss finish for decorative purposes is desired, and wherever a high degree of imperviousness to moisture is essential, there is no thinning material which can serve this purpose as well as it is served by varnish. In this large class belong mixed paints intended, among other purposes, for painting carriages, buggies and sleighs; for painting floors and painting or enameling other woodwork in the interior of buildings; for painting the walls and ceilings of kitchens, laundries, bath rooms and hospital ward rooms; for painting exposed structural iron surfaces of bridges, stairways, fire escapes and the like, etc., etc.

No suggestion is made in the answer, or in any part of the evidence, that varnish is under any circumstances harmful to mixed paint or that its use detracts from any useful quality of mixed paint; no suggestion that it is ever used improperly or as an adulterant. But the statute, by excluding varnish from the list of allowable ingredients of mixed paint, brands it as an adulterant. The manufacturer who understands his business and uses varnish in his mixed paints intended for any of the above mentioned purposes is subjected to prejudice and financial burdens not imposed upon his ignorant com-

petitor who, by failing to use varnish in such paints, places upon the market an article which is doomed to early destruction by the influence of moisture.

As we said in our Statement of the Case (p. 32, *supra*), the discrimination of the statute against varnish is absolutely without reason. It is as indefensible as it is undefended.

D. The Unreasonableness of the Exemption of Paste Paint (other than White Lead in Oil) from the Provisions of the Statute.

We have shown in the Statement of the Case that paste paint (other than white lead in oil), which covers a multitude of paints of paste consistency, is not touched by the statute (p. 10, *supra*). We have shown that whereas mixed paint is ready for application, paste paint requires the addition of oil to thin it sufficiently to make it ready for application (pp. 7, 33, *supra*).

The Century Dictionary, under the title "paint," has this to say on the difference between these two forms of paint: "Mixed paints, paints prepared by the manufacturer in a condition ready to be used by the consumer. Paint is usually sold in the form of a paste, to which the consumer has to add oil to thin it sufficiently to be applied with a brush. In mixed paints the oil, tinting colors and driers are all present."

It appears from the answer of the defendant that the only justification attempted for the provisions of the statute regarding the allowable ingredients of mixed paint, is the alleged improper substitution

of *other white pigments in place of the statutory pigments.* While paste paint requires the addition of *oil* to give it the brushing consistency possessed by mixed paint, it is, as regards the *pigment* body, in just as complete and final shape as mixed paint. In other words, if there were any valid reason for prohibiting the use, except upon onerous conditions, of Class A and Class B pigments in *mixed* paint, no reason has been suggested, and none can be perceived or imagined, why this prohibition should not extend to *paste* paint. Inasmuch as the oil which must be added to paste paint to give it brushing consistency can be bought and added by the consumer just as well as by the manufacturer of mixed paint, it is clear that paste paint comes in compepetition with mixed paint. But under the provisions of this statute the manufacturer of mixed paint containing any ingredient other than those enumerated by the statute, no matter how excellent his product, is subjected to prejudice and financial burdens not imposed upon the manufacturer of paste paint, no matter what ingredients his product may contain and no matter how poor and inefficient an article he may place upon the market.

E. The Legislative Purpose of the Provisions of the Statute Regarding Mixed Paint.

That the statute was not intended and has no tendency to promote the interests of health is charged by the bill of complaint and admitted by the demurrer (p. 11, 12, *supra*). Paint is not intended for food, drink or drug. *The handling of paint containing carbonate of lead is liable to cause*

lead poisoning. No such danger arises from the handling of paint not containing this pigment. If the legislature had intended this statute as a health regulation, it would certainly not have discriminated in favor of the poisonous carbonate of lead and against the non-poisonous Class A and Class B pigments.

There is not the slightest suggestion or supposition that any material excluded from the statutory enumeration which ever enters into the composition of mixed paint has a tendency to injuriously affect the substances intended to be painted. On the contrary, the evidence conclusively shows that *each of the Class A and Class B pigments possesses the quality of protecting and preserving the integrity of the substances to be painted in a higher degree than either of the statutory pigments or any combination thereof.*

If any *legitimate* purpose for these provisions can be imagined, it would be to protect the consumers of mixed paint in North Dakota against having imposed upon them an article differing in its origin or composition from the article intended to be bought or against having imposed upon them inferior or inefficient brands of this article.

We emphasize the word "legitimate," because an *illegitimate* purpose of the statute may be easily conceived, if we consider its natural and necessary effect. Its effect is to favor two powerful trusts,—the National Lead Company, which controls the output of carbonate of lead (p. 101, *supra*), and the New Jersey Zinc Company, which has a monopoly

of the production of oxide of zinc in the United States (Trans., 126; Rec., 207, 8),—by hampering their competitors, the manufacturers of sublimed lead, of zinc lead white, of lithophone, and of zinc from western ores, in their struggle for universal recognition. No matter whether this was the motive of the legislature or of any considerable number of those who voted for this statute, its effect as stated is obvious.

F. The Provisions of the Statute Regarding Mixed Paint Have No Just or Reasonable Relation to the Only Imaginable Legitimate Legislative Purpose and Have No Reasonable Tendency to Accomplish the Same. The Classification of Mixed Paints Created by the Statute Is Not Based Upon Any Difference Which Bears a Reasonable Relation to Such Purpose.

Can these provisions be justly or reasonably regarded as a regulation to protect consumers against unwittingly buying a substitute for an article of standard composition or against buying an article containing ingredients which are, or are believed to be, injurious?

It is alleged in the bill and admitted by the demurrer that *there is no natural standard of purity of paint, nor is there a generally or even widely accepted standard* of purity of paint; that the only standard to be applied to paint is a *standard of efficiency;* that the only test of the efficiency of paint is *its ability to serve the purposes for which it is intended,* viz., to protect the painted material from the destructive effect of exposure to atmospheric

conditions and the action of the elements, and to make the surface more pleasing to the eye; and that that paint is the most efficient which accomplishes these purposes in the highest degree for the longest time (p. 15, *supra*).

The answer of the defendant, moreover, admits that the manufacture of paint, and more particularly of mixed paint, has been *an evolutionary process* and that the means, methods and processes employed in such manufacture have changed materially in the course of years to conform to the discovery of new scientific facts and the results of practical experiments.

Paint in general, and mixed paint in particular, is *not an article of certain and definite composition.* Paint is defined by the Century Dictionary as "a substance used in painting, composed of a dry coloring material intimately mixed with a liquid vehicle." Upon the basis of Dr. Dudley's testimony, we have in our Statement of the Case defined paint as an artificial compound consisting of finely divided solid pigments mixed with and held together by oily liquids.

Paint certainly is not and can not be defined as finely divided carbonate of lead, or as finely divided oxide of zinc, or as a finely divided combination of these, intimately mixed with the proper oily liquids. Nor is it within reason to assume that a North Dakota farmer purchasing a can of mixed paint has in mind the getting of an article of such composition or, for that matter, of any particular composition. If there were any doubt about this, it would be removed by the fact that in 25 per cent. of all the

mixed paints consumed in North Dakota neither of the statutory pigments can possibly be used and that in at least another 25 per cent. of all mixed paints sold in North Dakota the statutory pigments, if used at all, must be mixed with some of the pigments excluded by the statute.

The proper composition of paint varies, and must necessarily vary, very materially, both as regards the ingredients to be used and the percentages of such ingredients, depending upon the material to be covered, the shades to be produced, upon the climate of the place where the paint is to be used, upon whether it is to be applied on the outside of buildings where it is subject to the destructive influence of adverse weather conditions or on the inside of structures; upon whether it is to be subject to strong physical contact, as in the case of floor paints, or to a high degree of moisture, as in the case of surfaces intended to be scrubbed. The proper efficiency of paint, even for the same particular purpose, may be produced by combinations of different ingredients in differing proportions. The composition of paint is, therefore, as uncertain and as variant as the composition of any artificial compound in the entire realm of human industry.

There is, therefore, no analogy between paint and articles of definite origin, character or composition, like butter or linseed oil or quinine.

If, *e. g.,* a purchaser asks for butter, he has in mind an article of definite composition and origin. He may not be able to tell what the chemical composition is, but he knows he wants an article which can only be made from pure cream or milk. But

not one out of a thousand consumers of mixed paint knows or cares anything about the origin or composition of paint, except that he probably knows it is a mixture of finely divided solid particles with some kind of oil. What he cares for is that the paint he buys should have the color he desires and should retain the same for a reasonable length of time; that it shall be fit to be spread evenly and smoothly over the surface; that two coats of it should completely hide the surface to be painted; that it shall not disintegrate for a number of years, etc., etc. Not one out of a thousand purchasers of mixed paint had ever, prior to the enactment of this law, heard of carbonate of lead or oxide of zinc or sublimed lead or zinc lead white or lithophone or barytes or silicate of magnesia, or had any belief about their merits or demerits as ingredients of paint.

It has not been shown *nor even asserted* that all ingredients other than those enumerated in the statute injuriously affect paint. The contrary appears affirmatively. It has not been shown *nor even asserted* that any consumer of mixed paint, let alone any considerable number of such, believes that all such other ingredients injuriously affect paint. It has not been shown *nor even asserted* that any consumer of mixed paint would decline to buy such, if he knew it contained any such other ingredient. The case is therefore totally dissimilar to those wherein statutes prohibiting the use of alum as an ingredient of baking powder, unless the same was labeled, were upheld. These cases proceeded upon the ground "that there has long existed a belief, more or less

general, that the use of alum as an ingredient in food is harmful." See *e. g.,* the case of *Stolz* v. *Thompson,* 44 Minn., 274, where the language just quoted from was used and where the court referred to several English statutes going back to the middle of the eighteenth century prohibiting the use of alum as an ingredient of bread..

Paints, therefore, containing ingredients other than those specified in the statute do not differ in composition from any natural standard of composition or purity, nor from a generally or even widely accepted standard, least of all from a standard of composition desired or expected by consumers of mixed paint, but differ merely from a purely arbitrary standard created by legislative fiat—a standard which is unjust and unreasonable (1) because it excludes materials which constitute useful, efficient, harmless and, in some cases, most essential ingredients of mixed paint,—materials which are commonly used by the most advanced and enlightened manufacturers and without using which paint in general and mixed paint in particular cannot be made as efficient as by using them; (2) because, by reason of its negative character, it is so vague and uncertain as to furnish no basis for comparison; and (3) because it includes among the specified ingredients an article which is totally unfit for use in any paint, and efficient paint cannot be made out of the remaining specified ingredients.

We have shown in the Statement of the Case (p. 14, *supra*) that one of the white pigments specified in the statute is totally unfit for use in paint. *Commercial* carbonate of lead, containing approximately two-thirds of pure carbonate of lead and one-third of lead hydroxide, is a proper ingredient of many, though by no means all, kinds of mixed paint. But *pure* carbonate of lead, the article specified in the statute, is neither proper nor fit to be used as an ingredient of any paint. This leaves only one other white pigment among the ingredients specified by the statute, vix., oxide of zinc. That oxide of zinc, if used as the sole white pigment, is in most cases totally incapable of producing satisfactory paint is alleged in the bill (paragraph 22), admitted by the demurrer and, moreover, has been abundantly shown by the testimony.

But disregarding the blunder of the legislature in specifying *pure* carbonate of lead, and treating the provision as though it had specified commercial carbonate of lead, can the enumeration of permissible ingredients serve as a standard?

The Century Dictionary defines "standard" as:

> "that which is set up as a unit of reference, a form, type, example, instance, or combination of conditions accepted as correct and perfect, and hence, *a basis of comparison,* a criterion, *established by custom, public opinion or general consent;* a model."

We have shown in the Statement of the Case (p. 12, *et seq., supra*) that the standard of composition set up by the statute is *purely negative.* While the standard excludes all materials not specified, the specification of materials is merely permissive.

The statute fails to require that all permissible ingredients be used and fails to prescribe maximum and minimum percentages.

Mixed paints wherein carbonate of lead is the *sole white pigment,* or wherein oxide of zinc is the *sole white pigment,* is, according to the testimony of every one of the six witnesses, a bad article. The evidence shows that such paint is on the market in North Dakota. Such paint is within the statutory standard. A combination between carbonate of lead and oxide of zinc in approximately equal parts, the proper proportion depending upon whether the paint is intended to be applied on the outside or inside of structures, is capable of making a fairly good white or light shade of paint. *But no matter in what proportion the statutory pigments are combined, the combination is within the statutory standard.* Ninety-nine per cent. carbonate of lead and 1 per cent. oxide of zinc, or 99 per cent. oxide of zinc and 1 per cent. carbonate of lead, or any one of the countless varieties of combinations other than the proper ones, are all within the statutory standard, though all are incapable of producing any but an inferior article. The evidence shows that mixed paints containing such combinations of various degrees of impropriety are on the market in North Dakota. They are all sanctioned by the statute.

Professor Ladd devotes several pages in his Bulletin to proving that linseed oil is the life of the paint. (Trans., 48-50; Rec., 78-81.) But mixed paint, provided it contain no ingredient other than those enumerated in the statute, *falls within the*

standard and need not be labeled, even if it contains no linseed oil at all.

Mixed paint falling within this standard does not, therefore, mean an article of definite composition. It does not mean an article containing all enumerated ingredients combined in proper proportions essential for efficiency, but it covers innumerable varieties of inefficient paint, some being inefficient by reason of lacking altogether one or more of the specified ingredients necessary for efficiency, others being inefficient by reason of the improper proportions in which the specified ingredients are combined.

Thus we find that the arbitrary standard set up by the statute is so vague, uncertain and inclusive as to furnish *no basis of comparison.*

But for want of a shorter term by which to refer to the mixed paints which are not required to be labeled, we have spoken and will continue to speak of the "statutory standard."

We have seen that it could not have been the purpose of the statute to protect purchasers against unwittingly buying mixed paint differing in composition from any natural or widely accepted standard, because none such exists. If it was its purpose to protect purchasers against unwittingly buying mixed paint *differing in composition from the fiat standard* created by the statute,—apart from the question whether it is within the power of the legislature to create such fiat standard for an artificial compound of the character of paint—*this purpose necessarily fails, because the standard set up*

does not define an article of definite composition and furnihes no basis for comparison.

Nor has the statute any reasonable relation to the assumed purpose to protect consumers of mixed paint against having imposed upon them inferior or inefficient brands of this article. This purpose would have been served, had the statute required that *all paint, no matter how made, should be labeled* so as to show all the ingredients used and their percentages.

But the statute of North Dakota, while requiring universal labeling in case of white lead in oil and compounds intended for the same use, does none of these things in its provisions regarding mixed paint. All it does is to stamp its approval upon thousands of varieties of inefficient mixed paint, the composition of which need not be disclosed, and to throw obstacles in the way of the manufacturer who would make use of the lessons of modern technology and make his product better than it can be made out of any combination of the statutory ingredients alone. It therefore has no reasonable relation to the object of preventing fraud.

We admit, yea, we insist, that there is a difference between the two classes of mixed paint created by the statute. But to justify classification it is not sufficient that there be a difference. *It is also necessary that the difference bear a reasonable and just relation to the purpose of the legislation.* If no legitimate reason exists for requiring the one class of mixed paints to be labeled which does not apply

equally to the exempted class, the classification can not stand.

One or another of the following alternatives must be true: Either the consumers of mixed paint in North Dakota had, at the time this statute was passed, no information or beliefs as to what ingredients are proper and in what proportions they should be combined to make good mixed paint, or they had such information or beliefs. If they had no such information or beliefs, then this statute cannot be justified as a regulation calculated to protect them against unwittingly buying an article differing in composition from what they intended it should have. It would be merely *an attempt on the part of the legislature to create in their minds beliefs which the evidence shows to be erroneous and unjust.* The statute can therefore be justified only on the assumption that the consumers of mixed paint had sufficient information on the subject to enable them to form a judgment as to the efficiency of mixed paint from a knowledge of its composition. Only upon this assumption can it be supposed that the presence of a label showing ingredients and percentages thereof will have a tendency to warn them against buying inefficient paint. But if this assumption is true, it leads necessarily to the conclusion that the consumers of mixed paint have information which would be sufficient to enable them to judge equally well of the efficiency of mixed paints falling within the statutory standard, if they knew the composition thereof.

We have seen that the class of mixed paints exempted from the requirement of labeling covers innumerable varieties of mixed paint which, by reason

of lacking altogether one or more of the permissible ingredients or by reason of combining the permissible ingredients in improper percentages, are inferior or inefficient and a fraud upon the purchaser. Upon the assumption which we have made, and without which no legitimate reason for the requirement of labeling could be divined, is it reasonable to suppose that a purchaser would be willing to buy a can of mixed paint containing no linseed oil at all, or containing no carbonate of lead at all, or containing no oxide of zinc at all, or in which the white pigment body consists of 5 per cent. carbonate of lead and 95 per cent. oxide of zinc, or the reverse, or in which the liquid ingredients would outweigh the solids, or any other of the inefficient varieties of mixed paint falling within the statutory standard, if a label on the can were to advise him that such is the composition of its contents?

Thus we see that the only imaginable legitimate reason for requiring the labeling of mixed paints which are not within the statutory standard applies equally to mixed paints which do fall within this standard. The classification is, therefore, not based upon any difference which bears a just or reasonable relation to the purpose of the statute.

To thus sanction and leave untouched innumerable possible varieties of inefficient mixed paint, and to make difficult, if not impossible, the sale of innumerable possible varieties of unexcellable mixed paint, is stretching the legislative power beyond the enduring point.

G. The Classification is in Reality between Manufacturers and not between Mixed Paints.

While the statute seemingly classifies mixed paints, in reality it classifies manufacturers of mixed paints.

As we have heretofore pointed out, the affidavit of Professor Ladd shows that there are certain manufacturers who confine themselves to the use of the statutory ingredients in the paints which they have placed upon the market in North Dakota. The complainants, however, do not confine themselves to the statutory ingredients, but, in the language of the bill, "each of them manufactures and, directly or indirectly, sells in the State of North Dakota mixed paints containing ingredients other than those specified in said act."

The labeling required by the statute cannot be done by the mixed paints. It must be done by the manufacturers. Nor can unlabeled mixed paints not conforming to the statutory standard be fined or imprisoned. It is the manufacturers who must stand these consequences.

The situation is similar to the one in *Connolly* v. *Union Sewer Pipe Co.*, 184 U. S., 540, where the Illinois anti-trust statute was under consideration. The ostensible classification there was between agricultural products or live stock while in the hands of the producer or raiser, on the one hand, and agricultural products or live stock while in the hands of other persons than the producer or raiser, and other commodities, on the other hand. The real classification was found by the court to be between

agriculturalists or live stock raisers dealing with their own products on the one hand, and persons or corporations not in that situation on the other hand.

H. The Reasonableness of the Statute is a Judicial Question.

The principles to be deduced from the decisions hereinafter quoted may be stated as follows:

The question of the reasonableness of a state statute ostensibly passed in the exercise of the police power is a judicial question. While every intendment is to be made in favor of the lawfulness of the exercise of this power, the courts will not imagine the existence of some undisclosed and unknown reason for its exercise. The simple decision of the legislature cannot be held to constitute such reason. The courts will inquire whether there is a reasonable ground upon which the legislation can be rested. It must be judged by its natural effect and not by its proclaimed purpose. In regard to any such statute the judiciary must decide upon its own responsibility: (1) Whether it has a real or substantial relation to one or another of the objects of the police power; (2) whether it has a reasonable tendency to accomplish the apparent or presumable legislative purpose, and (3) whether a classification created by it is based upon a difference which bears a reasonable or just relation to the purpose of the statute. If it falls by this test, it must be held obnoxious to the Fourteenth Amendment.

In *Mugler* v. *Kansas*, 123 U. S., 623, the court, speaking by Mr. Justice HARLAN, after observing that every possible presumption is to be indulged in favor of the validity of a statute, said that the *judiciary* must obey the constitution rather than the law making department of the government, and *must, upon its own responsibility, determine whether, in any particular case, the limits of the constitution have been passed*, adding (p. 661):

> "The courts are not bound by mere forms, nor are they to be misled by mere pretenses. They are at liberty—indeed, are under a solemn duty—to look at the substance of things, whenever they enter upon the inquiry whether the legislature has transcended the limits of its authority. If, therefore, a statute purporting to have been enacted to protect the public health, the public morals, or the public safety, has *no real or substantial relation* to those objects, or is a palpable invasion of rights secured by the fundamental law, *it is the duty of the courts to so adjudge*, and thereby give effect to the constitution."

In the case of *Lake Shore & M. S. R. Co.* v. *Ohio*, 173 U. S., 285, this court, speaking by the same learned judge, said (p. 301):

> "The *reasonableness or unreasonableness of a state enactment is always an element in the general inquiry by the court* whether such legislation encroaches upon national authority, or is to be deemed a legitimate exertion of the power of the state to protect the public interests or promote the public convenience."

In *Lake Shore & M. S. R. Co.* v. *Smith*, 173 U. S., 684, a statute of Michigan requiring thousand-mile tickets to be sold by railroad companies for less than the ordinary rates of fare, and making them valid

for two years after date of purchase, was held to be in conflict with the fourteenth amendment. Throughout the opinion, prepared by Mr. Justice Peckham, the requirement of *reasonableness* in the exercise of the police power is frequently emphasized. That the decision of the legislature is not final is asserted in this language (p. 699):

> "There is no *reasonable* ground upon which the legislation can be rested, *unless the simple decision of the legislature should be held to constitute such reason.*"

And the same justice, in *Wisconsin, M. & P. R. Co.* v. *Jacobson*, 179 U. S., 287, said (p. 301):

> "A statute, or a regulation provided for therein, is frequently valid, or the reverse, according as the fact may be, whether it is a *reasonable or an unreasonable* exercise of legislative power over the subject-matter involved. And in many cases questions of degree are the controlling ones by which to determine the validity or the reverse, of legislative action."

In *Dobbins* v. *Los Angeles*, 195 U. S., 223, this court, by Mr. Justice Day, said (p. 235):

> "It may be admitted that every intendment is to be made in favor of the lawfulness of the exercise of municipal power, making regulations to promote the public health and safety, and that it is not the province of courts, except in clear cases, to interfere with the exercise of the power reposed by law in municipal corporations for the protection of local rights and the health and welfare of the people in the community. But notwithstanding this general rule of the law, it is now thoroughly well settled by decisions of this court that municipal by-laws and ordinances, and even legislative enactments undertaking to regulate useful business enterprises, are *subject to investigation in the courts with a*

view to determining whether the law or ordinance is a lawful exercise of the police power, or whether, under the guise of enforcing police regulations, there has been an unwarranted and arbitrary interference with the constitutional rights to carry on a lawful business, to make contracts, or to use and enjoy property."

After referring to several decisions of this court asserting the principle that the reasonableness of the exercise of the police power is a judicial question, the opinion proceeds (p. 237):

"This principle was recognized and applied in the Supreme Court of California in a case decided later than the one under consideration. *In re Smith*, decided May 31, 1904, 77 Pac. Rep., 180, in which it was held that a county ordinance making it a misdemeanor to maintain a gas works within a sparsely settled district was unreasonable and void. In that case the court, after again quoting from *Munn* v. *Illinois*, to the effect that the courts will not interfere with laws which are within the scope of legislative power, well said:

'But running current with this principle, and to be read with it, is one of equal importance, namely, that when the police power is exerted to regulate a useful business or occupation, *the legislature is not the exclusive judge as to what is a reasonable and just restraint* upon the constitutional right of the citizen to pursue any trade, business, or vocation which in itself is recognized as innocent and useful to the community. *It is always a judicial question if any particular regulation of such right is a valid exercise of police power,* though the authority of the courts to declare such regulation invalid will be exercised with the utmost caution, and only when it is clear that the ordinance or law declared void passes the limits of the police power, and infringes upon rights guaranteed by the constitution.'"

Again, in the same case, the court said (p. 239):

> "But *the exercise of the police power is subject to judicial review*, and property rights can not be wrongfully destroyed by arbitrary enactment."

In *Lawton* v. *Steele*, 152 U. S., 133, Mr. Justice BROWN, delivering the opinion of the court, said (p. 137):

> "To justify the state in thus interposing its authority in behalf of the public, it must appear, first, that the interests of the public generally, as distinguished from those of a particular class, require such interference, and, second, that the *means are reasonably necessary* for the accomplishment of the purpose, and *not unduly oppressive* upon individuals. The legislature may not, under the guise of protecting the public interests, arbitrarily interfere with private business, or impose unusual and unnecessary restrictions upon lawful occupations. In other words, its determination as to what is a proper exercise of its police powers is not final or conclusive, but is *subject to the supervision of the courts.*"

In *Holden* v. *Hardy*, 169 U. S., 366, where a statute of Utah limiting the hours of labor in underground mines or in smelters was upheld, Mr. Justice BROWN, speaking for the court, after referring to authorities seemingly in conflict with this decision, said (p. 395):

> "It is sufficient to say of them that they have no application to cases where the legislature had adjudged that a limitation is necessary for the preservation of the health of employes, and *there are reasonable grounds for believing that such determination is supported by the facts.* The question in each case is whether the legislature has adopted the statute in exercise of a

reasonable discretion or whether its action be a mere excuse for an unjust discrimination, or the oppression or spoliation of a particular class."

In *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S., 150, the opinion of the court, by Mr. Justice BREWER, says (p. 154):

"While good faith and a knowledge of existing conditions on the part of a legislature is to be presumed, yet to carry that presumption to the extent of always holding that there must be some *undisclosed and unknown* reason for subjecting certain individuals or corporations to hostile and discriminating legislation is to make the protecting clauses of the Fourteenth Amendment a mere rope of sand, in no manner restraining state action."

A little further on, speaking of classification, the opinion says (p. 155):

"That must always rest upon *some difference which bears a reasonable and just relation to the act in respect to which the classification is proposed*, and can never be made arbitrarily and without any such basis."

And again, on page 165 of the same opinion:

"It is apparent that *the mere fact of classification is not sufficient* to relieve a statute from the reach of the equality clause of the Fourteenth Amendment, and that *in all cases it must appear* not only that a classification has been made, but also *that it is one based upon some reasonable ground—some difference which bears a just and proper relation to the attempted classification*—and is not a mere arbitrary selection."

In *Lochner* v. *New York*, 198 U. S., 45, wherein a statute limiting the hours of employment in bakeries was held unconstitutional, Mr. Justice PECK-

HAM, in delivering the opinion of the court, said (pp. 56-7):

> "It must, of course, be conceded that there is a limit to the valid exercise of the police power by the state. There is no dispute concerning this general proposition. Otherwise the Fourteenth Amendment would have no efficacy and the legislatures of the states would have unbounded power, and it would be enough to say that any piece of legislation was enacted to conserve the morals, the health, or the safety of the people; such legislation would be valid, no matter how absolutely without foundation the claim might be. The claim of the police power would be a mere pretext,—become another and delusive name for the supreme sovereignty of the state to be exercised free from constitutional restraint. This is not contended for. *In every case that comes before this court, therefore, where legislation of this character is concerned, and where the protection of the Federal Constitution is sought, the question necessarily arises: Is this a fair, reasonable and appropriate exercise of the police power* of the state, * * * *This is not a question of substituting the judgment of the court for that of the legislature.* If the act be within the power of the state, it is valid, although the judgment of the court might be totally opposed to the enactment of such a law. But the question would still remain: *Is it within the police power of the state? And that question must be answered by the court.*"

In the same opinion, after examining whether the statute bears any reasonable relation to the subject of health, the opinion proceeds (p. 64):

> *"It is impossible for us to shut our eyes to the fact that many of the laws of this character, while passed under what is claimed to be the police power for the purpose of protecting the*

> *public health or welfare, are, in reality, passed from other motives.* We are justified in saying so when, from the character of the law and the subject upon which it legislates, it is apparent that the public health or welfare bears but the most remote relation to the law. The purpose of a statute must be determined from the natural and legal effect of the language employed; and *whether it is or is not repugnant to the Constitution of the United States must be determined from the natural effect of such statutes when put into operation, and not from their proclaimed purpose.*"

The foregoing language forcibly applies to what we have hereinabove shown to be the easily conceivable *illegitimate* purpose of this statute.

In *C., B. & Q. R. Co.* v. *Illinois*, 200 U. S., 561, this court said (pp. 592-3):

> "And the validity of a police regulation, whether established directly by the state or by some public body acting under its sanction, must depend upon the circumstances of each case and the character of the regulation, *whether arbitrary, or reasonable*, and whether really designed to accomplish a legitimate public purpose. * * * If the means employed have no *real, substantial relation to public objects* which government may legally accomplish,—if they are arbitrary and unreasonable, beyond the necessities of the case,—*the judiciary will disregard mere forms, and interfere for the protection of rights injuriously affected by such illegal action.*"

In *Long* v. *State of Maryland*, 74 Md., 565, it was said:

> "It must always be conceded, of course, that the state can, through its legislature, by the legitimate exercise of its police powers, pass 'laws and regulations necessary for the protec-

> tion of the health, morals and safety of society' (*Singer* v. *State*, 72 Md., 466); yet such regulations must be *reasonable*, and 'what are reasonable regulations, and what are subjects of the police power, must be *necessarily judicial questions.*' *Toledo, W. & W. R. Co.* v. *Jacksonville*, 67 Ill., 40."

Powell v. *Pennsylvania*, 127 U. S., 678, is not opposed to the proposition that the reasonableness of a statute involving the exercise of the police power is a subject for judicial inquiry. In that case the statute was entitled "An Act for the protection of the public health, and to prevent adulteration of dairy products and fraud in the sale thereof." It prohibited the manufacture or sale of "any article designed to take the place of butter or cheese made out of any oleaginous substance other than that produced from unadulterated milk, or cream from the same," and also prohibited the manufacture or sale of any imitation or adulterated butter or cheese. A party having sold oleomargarine was charged with a violation of this statute. Upon the trial he *offered* proof tending to show the wholesome and nutritious character of the *particular oleomargarine* for the sale of which he was prosecuted. This evidence was not admitted. He did not offer proof tending to show that oleomargarine as generally manufactured and sold is wholesome, nutritious and unobjectionable. The question before the Supreme Court was, however, whether the statute in its general features was a proper exercise of the police power, and not whether, in the particular instance, the oleomargarine which had been sold was wholesome and nutritious. The opinion suggests that

proof of the wholesome, nutritious and unobjectionable character of oleomargarine *generally* would have been admissible, and it merely holds that, in the absence of such proof, the court cannot take judicial cognizance, contrary to the finding of the legislature, that most kinds of oleomargarine in the market are not injurious. Upon this point the opinion says (p. 684):

> "It will be observed that the offer in the court below was to show by proof that the *particular* articles the defendant sold, and those in his possession for sale, in violation of the statute, were, in fact, wholesome or nutritious articles of food. It is entirely consistent with that offer that many, indeed, that most kinds of oleomargarine butter in the market contain ingredients that are or may become injurious to health. The court cannot say, from anything of which it may take judicial cognizance, that such is not the fact."

That our interpretation of the holding of the court upon this point is correct appears from the dissenting opinion in *Schollenberger* v. *Pennsylvania*, 171 U. S., 1, wherein Mr. Justice GRAY, speaking for himself and Mr. Justice Harlan (the latter having written the opinion in *Powell* v. *Pennsylvania*), says of the decision in that case (p. 27):

> "That decision appears to us to establish that the courts cannot take judicial cognizance, *without proof*, either that oleomargarine is wholesome or that it is unwholesome."

In other words, no facts appeared in the record in the *Powell* case to justify a finding by this court that the legislature had acted unreasonably in prohibiting the sale of oleomargarine. But the court

would have had the power to so conclude, and would have thus concluded, had the record contained evidence showing that oleomargarine was, as a matter of fact and generally, wholesome, nutritious and unobjectionable.

In the case at bar, the court is not asked to take judicial cognizance, without proof, of the merits of the Class A and Class B pigments or of varnish, and of the fact that mixed paint cannot be made as efficient without the use of these materials as it can be made by using them. These facts are alleged in the bill and either admitted by the defendant or unquestionably established by proof. The purely negative character of the statutory standard is apparent upon the face of the statute; and the fact that it includes countless varieties of inefficient paint is shown partly by admissions and partly by the concurrent opinion of all the witnesses.

The difference between the *Powell* case and the case at bar, as respects the point under consideration, is that in the *Powell* case the record contained no proof tending to show the unreasonable character of the statute, while in the case at bar there is a record which excludes any other finding.

I. The necessary Effect of the Statute is to deprive the Complainants of Property without due Process of Law, and to deny to them the equal Protection of the Laws.

Each of the complainants "manufactures and, directly or indirectly, sells in the State of North Dakota mixed paints containing ingredients other than

those specified in said act." (Bill, par. 14, admitted by demurrer.)

Each of the complainants has by the high qualities of its (or their) products and by advertising the same in various ways established an enviable reputation for its (their) products, has sold large volumes thereof to users of paint in North Dakota for many years, the volume of its (their) sales of mixed paint having constantly increased from year to year and the value of the trade name in North Dakota attaching to their respective brands of mixed paint being variously alleged by them respectively to be from $10,000 to $50,000. (Bill, paragraphs 1 to 11, incl., admitted by demurrer.)

Two of the complainants are individuals. The others are corporations. "It is well settled that corporations are *persons* within the provisions of the Fourteenth Amendment of the Constitution of the United States." (*Gulf, C. & S. F. R. Co.* v. *Ellis,* 165 U. S., 150, 154 and numerous cases there cited.)

We contend as a matter of elementary constitutional law, as follows:

The right of the complainants to use their faculties for the purpose of making paint of the highest possible quality by applying the results of practical and scientific researches which have revolutionized the technology of paint manufacturing is a right of liberty, and their right to sell their products upon terms of equality with the less efficient products of less progressive competitors is a right

of property guaranteed to them by the Fourteenth Amendment.

In delivering the unanimous opinion of the court in *Allgeyer* v. *Louisiana*, 165 U. S., 578, Mr. Justice PECKHAM said (p. 589):

> "The liberty mentioned in that amendment means, not only the right of the citizen to be free from the mere physical restraint of his person, as by incarceration, but the term is deemed to embrace the *right of the citizen to be free in the enjoyment of all his faculties; to be free to use them in all lawful ways.*"

In *Powell* v. *Pennsylvania*, 127 U. S., 678, Mr. Justice HARLAN, in stating the opinion of the court, said (p. 684):

> "The main proposition advanced by the defendant is that his enjoyment *upon terms of equality* with all others in *similar* circumstances of the *privilege of pursuing an ordinary calling or trade*, and of acquiring, holding and *selling property*, is *an essential part of his rights of liberty and property*, as guaranteed by the Fourteenth Amendment. The court assents to this general proposition as embodying a sound principle of constitutional law."

Far be it from us to assert that this right of liberty and property is not held subject to the police power of the state. This power pre-existed the Fourteenth Amendment, and was not by it taken away from the states. But it was one of the purposes and effects of that amendment to define certain limitations of that power and to vest in the federal courts the authority to determine whether state statutes exceed those limitations. One of these limitations is that "no state shall * * * deprive

any person of * * * property, without due process of law."

Unless the complainants at the sacrifice of their convictions tamely submit to the tyrannous dictation of an ignorant legislature and change their formulas to correspond to the *fiat* standard of the statute, thus making a poorer paint than they know how to make—which would be to surrender their *liberty*, they must either cease altogether to sell mixed paints in North Dakota, thus abandoning a trade which it has taken years of effort and expense to build up and which has become of great money value—which would be to surrender their *property*, or they must label their products, thus suffering the prejudice against labeled paints created by the statute, and the financial burden involved in the labeling thereof—which would mean to be *deprived of property*.

We beg to refer the court to Chapter F. of our Statement of the Case (pp. 33, *et seq.*, *supra*) for the admitted facts regarding the financial burden which this prejudice and this direct expense impose upon the complainants.

As regards the direct expense, the case is too plain to require any argument.

As regards the burden of the suspicion and prejudice created, we beg to refer to the admirable reasoning in *People* v. *Hawkins*, 157 N Y., 1. In that case there came under consideration an act of the legislature of the State of New York which required all goods made by convict labor in any penal institution to be labeled "Convict Made" before

being sold or exposed for sale. The court said (p. 6):

> "We may assume, therefore, that the purpose of the law was to promote the welfare of the laboring classes by suppressing, in some measure, the sale of prison-made goods. Waiving for the present the question whether the means employed can ever in the nature of things accomplish the end in view, it is quite clear that unless this statute in some degree *affects the value* of certain articles of merchandise *by restricting the demand* or imposing conditions upon the right to deal in them as property, *in order to exclude them from the market*, it is a mere *brutum fulmen*. The scrubbing brush in question was beyond all doubt an article of property in which the defendant could lawfully deal. He is forbidden, however, by this statute, under all the penalties of the criminal law, from buying or selling or having it in his possession, except upon the condition that he shall attach to it *a badge of inferiority which diminishes the value and impairs its selling qualities.*"

And so here, a label showing that a can of mixed paint contains ingredients which the statute brands as adulterants would be a badge of inferiority, diminishing the value and impairing the selling qualities of the article.

The court further say (p. 7):

> "The citizen cannot be deprived of his property without due process of law. The principle embodied in this constitutional guaranty is not limited to the physical taking of property. Any law which annihilates its value, restricts its use or takes away any of its essential attributes, comes within the purview of this limitation upon legislative power. The validity of all such laws is to be tested by the purpose of their enact-

> ment and the practical effect and operation that they may have upon property. A law which interferes with property by depriving the owner of the profitable and free use of it, or *hampers him in the application of it for the purposes of trade or commerce, or imposes conditions upon the right to hold or sell it, may seriously impair its value*, against which the constitution is a protection."

If all mixed paints were required to be labeled, no prejudice rendering the sale more difficult and expensive, if not impossible, would arise from the presence of a label on the can. In that case there would not be any unlabeled mixed paints in the market.

Again, if the requirement of labeling applied to all mixed paints, the expense of analyzing the paint, and printing and affixing a label, would fall upon all mixed paint alike, increasing the cost of manufacture and sale alike in all cases. In such case this increased cost could and naturally would, be added to the selling price and thus be devolved upon the consumer. At any rate there would be an equal burden placed upon all manufacturers of mixed paint. Such a law insuring in all cases information to the consumer as to the composition of the mixed paint he buys, would be *regulation*. But the statute has subjected to this burden only one class of mixed paints. As these paints so discriminated against compete in the open market with the class of mixed paints not thus burdened, the increased cost cannot be added to the selling price and cannot be devolved upon the consumer, thus robbing the manufacturer of all or at least a part

of his profits and depriving him of property. This is not regulation, but *restraint* or *inhibition.*

That to restrict one's freedom of competition upon equal terms with others *in the same business* amounts to prohibition, was held by this court in *Brimmer* v. *Rebman*, 138 U. S., 78, where Mr. Justice HARLAN, delivering the unanimous opinion of the court, said (p. 82):

> "The statute is, in effect, a prohibition upon the sale in Virginia, of beef, veal or mutton, although entirely wholesome, if from animals slaughtered one hundred miles or over from the place of sale. We say *prohibition*, because the owner of such meats cannot sell them in Virginia until they are inspected there; and being required to pay the heavy charge of one cent per pound to the inspector, as his compensation, he *cannot compete, upon equal terms*, in the markets of that Commonwealth, *with those in the same business*, whose meats, of like kind, from animals slaughtered within less than one hundred miles from the place of sale, are not subjected to inspection at all."

It is an axiom of political economy that the financial burden placed upon any particular kind of business by a governmental regulation,—be this burden in the shape of a tax or an impost or an excise or an inspection fee, or any other shape—is *devolved upon the ultimate consumer*, save under exceptional circumstances. *The cost* of producing or selling any commodity, be it grain, meat, milk, liquors, clothing, insurance or real estate, *is increased by the amount of whatever financial burden is by such regulation placed* upon the business of producing or selling the commodity. All this cost plus such profit as the conditions of competition and of

supply and demand permit is charged to and devolved upon the consumer. But this law of political economy applies only to a governmental regulation which affects equally all those who or whose commodities come in direct competition. *Such devolution of the burden of governmental regulation upon the consumer is impossible, if it affects only a portion of those who or whose goods come into competition.* The mere fact that those not thus affected have no occasion to increase the selling price, prevents those thus affected from adding the amount of the burden to their selling price.

It cannot be too strongly emphasized, and it will help to distinguish other cases wherein classifications were upheld, to keep in mind that this devolution of the burden of governmental regulation is prevented only where it affects commodities which come in competition with commodities of the same class left untouched by the regulation.

As was said in *Soon Hing* v. *Crowley,* 113 U. S., 703, Mr. Justice FIELD speaking for the entire court, (p. 709):

> "The specific regulations for one kind of business, which may be necessary for the protection of the public, can never be the just ground of complaint because like restrictions are not imposed upon *other* business of a *different* kind. *The discriminations which are open to objection are those where persons engaged in the same business are subjected to different restrictions,* or are held entitled to different privileges under the same conditions. It is only then that the discrimination can be said to impair that equal right which all can claim in the enforcement of the laws."

If *e. g.*, a burden in the shape of an inspection fee be placed upon *all* dealers in milk, the fact that the same or a similar burden is not placed upon dealers in meat or grain or clothing will not prevent milk dealers from increasing the selling price of milk and thus devolve upon the consumers the increase in the cost to themselves. But suppose a statute were to impose this burden only upon milk taken from brown cows; the increased cost of such milk could not be devolved upon the consumers, because it would come in competition with all the milk taken from cows of other colors. In such case the owners of brown cows would be deprived of their property without due process of law.

And so in the case at bar, suppose it costs the manufacturer $1 to produce and place in the hands of the retail dealer a gallon of mixed paint. Sup pose he adds ten cents for his profit, thus making the wholesale price $1.10 per gallon. Suppose the expense of analyzing each batch of mixed paint and of printing and affixing labels adds five cents to the cost per gallon. If *all* mixed paints had to be labelled, the natural result would be that *all* manufacturers would add this additional cost to the wholesale price, thus making it $1.15, and no manufacturer would be hurt. The *consumer* would have to pay for the information which the legislature thought he ought to have. But the situation is entirely different where *some* mixed paints have to be labelled which compete with all other mixed paints which need not be labelled. If the manufacturer of non-statutory mixed paint were to attempt to increase his wholesale price so as to reimburse

himself in whole or even in part for the cost of labelling, charging $1.15 or even $1.11 for a gallon of mixed paint, he simply could not sell it, because the other manufacturer whose product is sanctified by the statute, having no such additional cost, would naturally continue to offer a gallon of mixed paint for $1.10. But beyond that, the effort to overcome the prejudice against labelled paints created by the statute, assuming that it were successful, would still further increase the cost of the manufacturer of mixed paints which require labelling, and tend to further decrease or wipe out his profit. In other words, the complainants cannot devolve upon their customers the financial burden placed upon them by the requirement to label their mixed paints, because these come in competition with mixed paints falling within the statutory standard, and also with *paste* paint, which is not subject to this burden. Therefore, the complainants are deprived of property to the extent of this burden.

This taking of property is without due process of law, and this inequality of burden is a denial of the equal protection of the laws, because, as we have seen, the statute which is to have this effect has no just relation to the only imaginable legislative purpose and has no reasonable tendency to accomplish the same, and because the class exempted is in the same situation—that is, in the same relation to the purpose of the statute—as the class which is burdened by its provisions.

If a statute ostensibly passed in the exercise of the police power cannot be fairly referred to any of the recognizable objects of that power, or if it

does not fairly tend to accomplish its ostensible object, it is of course invalid. But the converse of this proposition is not true. A statute may fairly be referred to the police power of the state and may fairly tend to accomplish the object sought to be attained and still be invalid, if it conflicts with any provision of the fundamental law. With the mere wisdom of a statute the courts have no concern. Which of several constitutional methods available to the legislature in coping with an evil has been chosen is not a subject for judicial scrutiny. But no statute can be valid, if it impairs the obligation of a contract or interferes with interstate commerce or deprives a person of property without due process of law or involves a denial of the equal protection of the laws.

Therefore, even if this court should reach the conclusion that the statute in the case at bar fairly refers to the subject of preventing fraud and reasonably tends, so far as it goes, to accomplish this purpose, still it must be held unconstitutional, as the necessary effect flowing from its unreasonable classification is to deprive the complainants of property without due process of law and to deny to them the equal protection of the laws.

As Mr. Justice HARLAN, in delivering the opinion of this court in *Connolly* v. *Union Sewer Pipe Company*, 184 U. S., 540 (558), said:

> "The question of constitutional law to which we have referred cannot be disposed of by saying that the statute in question may be referred to what are called the police powers of the state, which, as often stated by this court, were not included in the grants of power to the general

> government, and therefore were reserved to the states when the constitution was ordained But as the Constitution of the United States is the supreme law of the land, anything in the constitution or statutes of the states to the contrary notwithstanding, a statute of a state, even when avowedly enacted in the exercise of its police powers, must yield to that law. No right granted or secured by the Constitution of the United States can be impaired or destroyed by a state enactment, whatever may be the source from which the power to pass such enactment may have been derived."

In the further course of the opinion, Mr. Justice HARLAN approvingly refers to the language of this court in *Barbier* v. *Connolly,* 113 U. S., 27, where it was said that the fourteenth amendment undoubtedly intended, among other things:

> **"that no impediment should be interposed to the pursuits of any one except as applied to the same pursuits by others under like circumstances; that no greater burdens should be laid upon one than are laid upon others in the same calling and condition."**

The application of this language to the facts of the case wherein it was quoted conclusively shows that the words "like" and "same" are not to be understood literally or strictly. They do not mean "identical," but refer merely to sameness of conditions as regards the purpose of a particular law. For in *Connolly* v. *Union Sewer Pipe Co.* it was held that producers or raisers of agricultural products or live stock were in the *same* class not only with merchants dealing in *these* commodities, but also with merchants dealing in *totally different* com-

modities, in relation to the purpose of the statute which was to hinder combinations entered into for the purpose of controlling prices.

The right to make *reasonable* classifications was conceded, but the court say (p. 560):

> "The difficulty is not met by saying that, generally speaking, the state when enacting laws may, in its discretion, make a classification of persons, firms, corporations and associations, in order to subserve public objects. For this court has held that classification 'must always rest upon *some difference which bears a reasonable and just relation to the act in respect to which the classification is proposed,* and can never be made arbitrarily and without any such basis * * * But arbitrary selection can never be justified by calling it classification. The equal protection demanded by the 14th amendment forbids this. * * * *No duty rests more imperatively upon the courts than the enforcement of those constitutional provisions intended to secure that equality of rights which is the foundation of free government.* It is apparent that the mere fact of cla ification is not sufficient to relieve a statute from the reach of the equality clause of the 14th amendment, and that in all cases it must appear not only that a classification has been made, but also that it is one based upon some reasonable ground,—some difference which bears a just and proper relation to the attempted classification—and is not a mere arbitrary selection.' *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S., 150."

Now if agricultural products or live stock and sewing machines or pianos may be said to belong to the *same* class in relation to the legislative purpose of preventing combinations, it certainly cannot be doubted that paste paint, mixed paints con-

taining no ingredients other than those enumerated, and mixed paints which do contain an ingredient or ingredients other than those enumerated, all these coming in competition with each other, belong to the same class and are in a like situation as regards the legislative purpose to prevent imposition upon purchasers, when the opportunity for imposition is open in the exempted classes at least in the same degree as in the class discriminated against.

Suppose that the legislature of North Dakota, instead of making the discrimination it did, had reversed the situation and provided that any mixed paint containing only the ingredients enumerated in the statute must be labelled, and had exempted mixed paints which contain any other ingredient. Such a law might well be defended upon the basis of the teachings of modern paint technology that efficient paint cannot be made out of the statutory ingredients alone. But in view of the fact that the presence of other ingredients is no guaranty against inefficiency of the products, would there be any doubt that the two kinds of paint are in the *same* condition or situation as regards the legislative purpose? If they would be in the same situation in the case just supposed, they must be held to be in the same situation in the case made by the statute.

While in many cases it has been held by this court that railroad companies may be put in a class by themselves where the legislative purpose is to cast upon them peculiar responsibilities in connection with the conduct of their hazardous business, still in *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S., 150,

railroad companies and all other corporations, as well as all individuals were held to be in the *same* class, *i. e.*, in the *same* situation in relation to the legislative purpose of a statute to prevent or discourage the interposition of untenable defenses to claims of a *general* nature not exceeding $50 in amount.

In *Cotting* v. *Kansas City Stock Yards Co.*, 183 U. S., 79, a statute of Kansas limited the charges of any stock yards which for the preceding twelve months had an average daily receipt of not less than 100 head of cattle, or 300 head of hogs or sheep. The evidence showed that while there were numerous stock yards in the state, the Kansas City Stock Yards Company was at that time the only one whose business was of sufficient size to bring it under the provisions of the statute. Of course, the decision finding this statute opposed to the 14th amendment would have been the same had it appeared that even one-half of all the stock yards in the state did and the other half did not come under the provisions of the law. That it applied for the time being to only one stock yards merely aggravated the case. The principle of the decision was that a difference in the size of business establishments of the same general character furnishes no ground for legislative differentiation in the rates to be charged the public. In the course of the opinion of the court Mr. Justice BREWER asks this significant question (p. 104, 5):

> "Is it true in this country that one who by his attention to business, by his efforts to satisfy customers, by his sagacity in discerning the probable courses of trade, and by contributing of his means to bring trade into those lines,

> succeeds in building up a large and profitable business, becomes thereby a legitimate object of the legislative scalping knife?"

We might well paraphrase this question by asking: Is it true in this country that those who by their attention to the results of scientific researches, by their willingness to spend money and energy in testing the teachings of modern technology, and by their enterprise in practically applying these lessons have improved their products, become thereby a legitimate object of the legislative scalping knife?

Again, the opinion says (pp. 111, 112):

> "But while recognizing to the full extent the impossibility of an imposition of duties and obligations mathematically equal upon all, and also recognizing the right of classification of industries and occupations, we must nevertheless always remember that the equal protection of the laws is guaranteed, and that such equal protection is denied when upon one of two parties *engaged in the same kind of business and under the same conditions* burdens are cast which are not cast upon the other. There can be no pretense that a stock yard which receives 99 head of cattle per day a year is not doing precisely the same business as one receiving 101 head of cattle per day each year. It is the same business in all its essential elements, and the only difference is that one does more business than the other. But the receipt of an extra two head of cattle per day does not change the character of the business. If once the door is opened to the affirmance of the proposition that a state may regulate one who does much business, while not regulating another who does the same but less business, then all significance in the guaranty of the equal protection of the laws is lost, and the door is opened to that inequality

of legislation which Mr. Justice Catron referred to in the quotation above made. This statute is not simply legislation which in its indirect results affects different individuals or corporations differently, nor with those in which a classification is based upon *inherent differences in the character* of the business, but is a positive and direct discrimination between persons *engaged in the same class of business*, and based simply upon the quantity of business which each may do."

Just so in the case at bar there can be no pretense that a manufacturer who makes mixed paint by confining himself to the statutory pigments is not doing precisely the same business as a manufacturer who, without entirely excluding the statutory pigments, avails himself of the widened range of white pigments provided by modern technology. It is the same business in all its essential elements, and the only difference is that the exempted manufacturer cannot possibly make as good an article as the one discriminated against.

In the *Cotting* case the difference upon which the attempted classification was sought to be justified was in the *size* of the business. In the case at bar the difference upon which the attempted classification is sought to be justified, is, as regards the Class A pigments, in the *age* of the various pigments. But as the evidence has conclusively shown the truth of the allegation that the younger Class A pigments are, depending upon circumstances, as efficient as or more efficient than the older, statutory pigments for the purposes for which the latter are used in paint, the difference in age does not bear any more reasonable relation to the purpose of the

statute here than did the difference in size to the purpose of the Kansas statute. And as the evidence has likewise shown not only that the possibility and probability of imposition upon the purchaser through a failure to disclose ingredients is equally great in all kinds of paint, but also that paints which need not be labelled cannot possibly be as efficient as paints which are required to be labelled, the classification is totally without reason.

Unreasonable classification has in some particular cases been held to involve merely a denial of the equal protection of the laws; in others it has been held to involve also a deprivation of property without due process of law. That in the case at bar it also involves the latter is the result of economic laws hereinabove shown.

That it is not due process of law for a legislature to *create* classes by its *fiat*, as was done in the case at bar, and then to discriminate between them is forcibly asserted in *Missouri* v. *Ashbrook*, 154 Mo., 375, 48 L. R. A., 265 (272), where it is said:

> "'Due process of law' is denied when any particular person of a class or of the community is *singled out for the imposition of restraints or burdens* not imposed upon and to be borne by *all of the class*, or of the community at large, unless the imposition or restraint be based upon *existing* distinctions that differentiate the particular individuals of the class to be affected from the body of the community; and this question as to whether the persons thus designated constitute a *natural* or a *reasonable* class *depends upon facts which the court passing upon the validity or invalidity of the legislation must determine upon*. While the legislature, under its vested authority and power, may arbitrarily

impose taxes, restraints and burdens of various kinds, within the constitutional limitations prescribed, that may become most onerous and oppressive to the citizen, which the courts can do naught but uphold, *it cannot create conditions or fiat classes that will operate to make legislation alone applicable to those artificial conditions and classes* as general law within the meaning of the constitution, or that will entitle it to the designation of 'the law of the land,' or that will make the act 'due process of law' by which alone the liberty of the citizen may be restrained, or his property burdened or disposed of."

In *State* v. *Julow*, 129 Mo., 163, 29 L. R. A., 257, the Supreme Court of Missouri considered the constitutionality of a statute which restricted the right of employers to discharge laborers who were members of labor unions. The statute made a classification between persons who are and persons who are not members of labor unions with reference to the right of employers to discharge them. The court might well have found that the element of membership in a trades union creates an important difference between the two classes attempted to be created by the statute. The court might well have conjectured that in placing special restrictions upon the right to discharge members of labor unions, the legislature had in mind the likelihood of strikes in these cases, and the absence of likelihood of strikes in the case of the discharge of unorganized laborers. But the question which the court examined was whether this classification bore any reasonable and just relation to the subject-matter of the right of an employer to discharge his laborers. This was denied, the court saying:

"But the statute is obnoxious to criticism on other grounds. It does not relate to persons or things as a class,—to all workingmen, etc.,—but only to those who belong to some 'lawful organization or society,' evidently referring to a trade union, labor union, etc. Where a statute does this,—*where it does not relate to persons or things as a class, but to particular persons or things of a class,*—it is a special, as contradistinguished from a general law. *State* v. *Tolle*, 71 Mo., 645; *State* v. *Herrmann*, 75 Mo., 340. Here a non-trade-union man or a non-labor-union man could be discharged without ceremony, without let or hindrance, whenever the employer so desired, with or without reason therefor, while, in the case of a trade-union or labor-union man, he could not be discharged if such discharge rested on the ground of his being a member of such an organization. In other words, the legislature have undertaken to limit the power of the owner or employer as to his right to contract with or to terminate a contract with particular persons of a class and therefore the statute which does this is a special, not a general law, and therefore violative of the constitution. Judge Cooley says: 'A statute would not be constitutional which should select particular individuals from a class or locality and subject them to peculiar rules, or impose upon them special obligations or burdens, from which others in the same class or locality are exempt. Every one has a right to demand that he be governed by general rules, and a special statute which, without his consent, singles his case out as one to be regulated by a different law from that which is applied in all similar cases would not be legitimate legislation, but would be such an arbitrary mandate as is not within the province of free government.' Cooley, Const. Lim., 391. The legislature may legislate in regard to a class of persons, but *they cannot take what may be*

> *termed a natural class of persons, split that class in two, and then arbitrarily designate the dissevered fractions of the original unit as two classes, and enact different rules for the government of each. This would be a mere arbitrary classification*, without any basis of reason on which to rest, and would resemble a classification of men by the color of their hair or other individual peculiarities, something not competent for the legislature to do. *State* v. *Herrmann*, 75 Mo., 353."

So here the legislature may not split up a natural class of persons, the manufacturers of paint, and still less the narrower natural class of manufacturers of mixed paint, and then arbitrarily designate the dissevered fractions of the original unit as two classes, imposing upon one the burden of labeling their products and exempting the other from such burden.

In *Luman* v. *Hitchins Brothers Co.*, 90 Md., 14, 46 L. R. A., 393, the Supreme Court of Maryland considered the constitutionality of a statute which made it unlawful for any railroad or mining corporation, doing business in Allegany County, or for any officer of such corporation to own or have any interest in any general store or merchandise business in Allegany County.

The court did not speculate upon the possibility of the existence of some undisclosed reason for distinguishing with reference to the prohibited activities between officers of railroad and mining corporations on the one hand, and the officers of other corporations on the other hand. The court said:

> "A statute which denies to one person the protection that is accorded to others

under the same conditions and in the like situation, or which imposes on one a burden not similarly borne by others, is, because it discriminates, in both instances, invalid under the paramount organic law. Though it was perfectly competent to the legislature to prevent railroad and mining corporations from engaging in the business of bartering or selling goods, wares, and merchandise, either by not conferring such a power upon them in their charters, or, if it had been conferred, then by subsequently amending the charters and imposing the restriction by such an amendment, yet it was obviously not within the power of the general assembly to deny to particular individuals who happened to be officers of those corporations, and merely because they were such officers, the right which every other citizen of the county, whether an officer of other corporations or not, possessed to sell goods, wares and merchandise within the county. Whilst the legislature may, under conditions, create classes and subject all persons coming within the classifications to burdens or duties not imposed upon individuals outside of the classes, *these classifications must not be arbitrary or unreasonable, but must rest upon some difference which bears a reasonable and just relation to the act in respect to which the classification is proposed.*"

In *Bailey* v. *The People*, 190 Ill., 28, a statute which provided that no more than six persons shall occupy the same room for sleeping purposes in any lodging house at the same time, in any city of 100,000 inhabitants or more, was held void, as depriving lodging house keepers of their property without due process of law, because it discriminated against lodging houses and in favor of hotels, inns or boarding houses. The court say (p. 35):

"This legislation is directed only against lodging house keepers. Keepers of boarding houses, inns, hotels and taverns do not fall within the purview of its prohibition. If the enactment is a valid one, inn or hotel keepers and the keepers of boarding houses may lodge seven or any greater number of guests, without incurring the penalties which, under the provisions of this enactment, would be visited upon a lodging house keeper should he allow more than six persons to occupy the same sleeping apartments at the same time. This is to discriminate against the lodging house keepers as a class, and to deprive them of liberty and a property right which other persons engaged in *business of the same general character and similarly* conducted may freely exercise without let or hindrance."

The statute was sought to be upheld as a measure in the interest of health. Upon this point the court say (p. 37):

"Some lodging houses, as it is urged, may be, and doubtless are, the recognized abiding places of unclean, diseased and vermin-infected guests or patrons, who, together with the owners or keepers of the lodging houses, are wholly indifferent to sanitary conditions, rendering such houses sources of contagious and infectious diseases. But it cannot be asserted that all lodging houses are of this character; neither can it be said boarding houses, inns and hotels are not to be found which shelter the same class of patrons and whose keepers are likewise indifferent to sanitary conditions. The public health is less endangered by a cleanly and well conducted lodging house than by a filthy, ill-managed, disease-breeding hotel or boarding house. The lodging of more than six persons in any room in a cleanly lodging house cannot be condemned, from a sanitary point of view, any

> more than the lodging of a like number of guests in one room in a hotel or boarding house. If intended as a measure to protect health, the act should have been directed against the evil which threatens to introduce sickness or disease, whether found in a lodging house, boarding house or hotel, and as its penalties are not so leveled, it can but be regarded as partial and discriminatory legislation."

The application of this decision to the case at bar is manifest. Some mixed paints not conforming to the statutory standard of composition may be and doubtless are lacking in efficiency. But this is true in at least the same degree of mixed paint conforming to that standard as well as of paste paint. The public is less liable to be imposed upon by mixed paint containing some Class A or Class B pigment, where all ingredients necessary for efficiency are combined in proper proportions, than by countless varieties of mixed paint containing no ingredient other than the statutory ones, where one or another of the ingredients necessary for efficiency is lacking or where the ingredients are combined in improper proportions. If the measure was intended to secure to purchasers of paint the proper information as to its composition so that they may be enabled to judge of its efficiency, the act should have applied to all paint or at least to all mixed paint alike.

J. Some Cases Distinguished.

Anticipating that counsel for the defendant may cite in their brief certain decisions on which they relied in the court below or may rely in this court, we beg to suggest the grounds upon which they may be distinguished in principle from the case at bar.

1. The Oleomargarine Cases.

In *Powell* v. *Pennsylvania*, 127 U. S., 678, the entire suppression of the oleomargarine business was justified upon the ground of the probability or possibility that (p. 685) "the manufacture of oleomargarine, or imitation butter, of the kind described in the statute, is, or may be, conducted in such a way, or with such skill and secrecy as to baffle ordinary inspection," or that it may involve "such danger to the public health as to require, for the protection of the people, the entire suppression of the business."

No parallel can be drawn between a statute which distinguishes between butter and oleomargarine and a statute which distinguishes between paints in the manner here attempted. An article which is not made from milk or cream is not butter. There is no other way of making butter. There is a natural and absolutely defined standard of butter. No article of food, be it ever so nutritious or wholesome, be it ever so similar to butter in its chemical composition or in its effect upon the human system, is butter, unless it is produced from milk or cream. Oleomargarine is not produced from milk or cream. Hence it is not butter. That oleomagarine serves the same purpose and may be equally as nutritious and harmless as butter is beside the point. The point is that it is essentially something else than butter and cannot lawfully be called or sold as butter. The difference between butter and oleomargarine is not one created by statute. It is rather a *natural* difference. The difference is just the same in principle

as the difference between butter and olive oil, or butter and lard, or butter and goose grease. But the difference between paints falling within the legislative standard and paints falling without, is not a natural difference, but a difference created by statute. Any mixture of solid matter and oil which is capable of being spread in a thin layer over a surface and fit to serve the purpose of protecting and hiding the surface is paint. There is no natural nor even a widely accepted standard for paint. There is no particular compound made according to any definite formula which is exclusively entitled to be called paint. We have seen that there are countless varieties of paint all of which fall within the standard of *permissible* composition arbitrarily established by the statute. Who is there to say, in the face of the evidence in this record, that a compound of which oxide of zinc is the sole white pigment is entitled to be called paint, and that another compound, the white pigment body of which consists of fifty per cent. carbonate of lead, forty-five per cent. oxide of zinc and five per cent. sublimed lead, is not entitled to be called paint? Who is there to say that any one of the thousands of varieties of paint containing an ingredient other than those enumerated in the statute, and which are shown by the evidence to be vastly superior to thousands of varieties of paint falling within the legislative standard, is not entitled to be called paint?

Butter is an article of practically certain composition and absolutely certain origin. Paint, on the other hand, is a compound of no certain composition.

Not only can efficient paint be made in an innumerable variety of ways, but it must be made in different ways according to the varying conditions under which it is to be applied. No matter how made, if it is capable of serving the functions of paint, it is paint. Its character as paint does not depend upon the particular ingredients it contains, but upon its possession of certain qualities. No matter by what ingredients these qualities are imparted, if an article possesses them, it is paint.

Again, in making a classification between butter and oleomargarine, the legislature of Pennsylvania fixed as a standard an article of absolutely defined physical quality and chemical composition derived from a natural product of practically unvarying character. This article has for ages been universally used as an article of food. It is universally recognized as the standard of excellence for this class of food. By reason of its definite character and composition, it furnishes a definite and fixed standard for comparison with all other articles of food designed to take its place. If in the case at bar the statute had fixed a definite standard of mixed paint by providing, *e. g.*, that it should contain thirty per cent. carbonate of lead, thirty per cent. oxide of zinc, thirty-five per cent. linseed oil, four per cent. turpentine and one per cent. japan dryer, to which may be added pure colors in any quantity necessary to produce a desired shade, then no matter how paint technologists might differ as to the efficiency of the article thus composed, there would at least have been furnished by the statute a standard of comparison. In that case there might

have been a possible analogy between it and the oleomargarine statute of Pennsylvania. But the statute in the case at bar has created a purely negative standard, including within its definition paints containing no carbonate of lead at all, paints containing no oxide of zinc at all, paints containing combinations of these two pigments in all the thousands of possible variations of percentages and fractions of percentages, paints containing no linseed oil at all, paints containing no turpentine at all, paints containing no Japan dryer at all, paints containing combinations of two or all of these liquids in any one of the countless possible variations of percentages and fractions of percentages, paints which would be very efficient, paints which would be fairly efficient, paints which would be moderately efficient, paints which would have little efficiency, and paints which would be worthless. The definition of sanctioned paints is therefore so vague, so uncertain, so shadowy, that it furnishes absolutely no basis of comparison and therefore does not fix a standard at all. Between a classification by which paints thus vaguely and negatively defined are exempted from a burden of governmental regulation, and the classification by which an article like butter is distinguished from oleomargarine, there can be no analogy.

Practically the same considerations apply to the case of *Capital City Dairy Co.* v. *Ohio* 183 U. S., 238, wherein a statute of Ohio was attacked on the ground that the use of harmless coloring matter in oleomargarine was forbidden, but was allowed in butter. The discrimination was justified on the

ground that it was proper to provide a means by which the public might know that an article offered for sale was butter and not oleomargarine. The court said that the case was governed by *Powell* v. *Penna.*, 127 U. S., 678, and *Plumley* v. *Mass.*, 155 U. S., 461. The public is liable to be deceived into buying oleomargarine under the belief, induced by the coloring matter used therein, that it is butter. Coloring matter used in butter has no such or similar tendency, because it does not change the character of the butter as butter and does not give the appearance of butter to something which is not butter.

2. The Attorney's Fee Cases.

(A.) In *Atchison, T. & S. F. R. Co.* v. *Matthews*, 174 U. S., 96, this court considered a statute of Kansas which provided that in all actions against a railway company for damages by fire caused by the operation of the railroad, proof of the fact that the fire complained of was caused by the operation of the railroad shall be *prima facie* evidence of negligence, and that in such actions a reasonable attorney's fee shall be allowed to the plaintiff as a part of his judgment.

This case was distinguished from *Gulf, etc., R. Co.* v. *Ellis*, 165 U. S., 150, by Mr. Justice Brewer, who wrote the opinion in both cases, upon the ground that in the Texas statute in the *Ellis* case nothing was involved except a penalty against railroad corporations for not paying small debts irrespective of their origin, whereas the purpose of the Kansas statute considered in the *Matthews* case "is not to

compel the payment of debts, but to secure the utmost care on the part of railroad companies to prevent the escape of fire from their moving trains," as is obvious from the language of the statute which imposes the liability in question only in cases where the fire is "caused by the operating" of the road. The opinion says (p. 98):

> "It is true that no special act of precaution was required of the railroad companies, failure to do which was to be visited with this penalty, so that it is not precisely like the statute imposing double damages for stock killed where there has been a failure to fence. *Missouri Pac. Ry. Co.* v. *Humes*, 115 U. S., 512. And yet its purpose is not different. Its monition to the railroads is not, pay your debts without suit or you will, in addition, have to pay attorney's fees; but rather, see to it that no fire escapes from your locomotives, for if it does you will be liable, not merely for the damages it causes, but also for the reasonable attorney's fees of the owner of the property injured or destroyed."

In giving the statute this meaning, the court followed the interpretation which had previously been given to it by the state Supreme Court and which commended itself to the judgment of this court.

The placing of railroad corporations in a separate class with reference to the legislative purpose of guarding against the peculiar dangers incident to the operation of railroads is, of course, perfectly justified, so that the *Matthews* case is merely in line with the cases which declared valid statutes imposing upon railroad companies alone the obligation to fence their rights of way and making them responsible for all damages sustained in consequence of a

failure to do so (*Missouri Pac. R. Co.* v. *Humes*, 115 U. S., 512); statutes depriving railroads, when sued by an employe for injuries, of the defense that the injuries were due to the negligence of a fellow servant (*Missouri Pac. R. Co.* v. *Mackey*, 127 U. S., 205); statutes making railroad companies absolutely liable for personal injuries to passengers except in cases of criminal negligence of the latter (*Chicago, etc., R. Co.* v. *Zernecke*, 183 U. S., 582), and similar cases, in all of which the classification was justified on the ground of the hazards which exist in and surround modern railroad transportation.

If the statute considered in the *Matthews* case had visited with its penalties only such railroad companies as use locomotives built east of the Allegheny mountains or only such railroad companies as burn anthracite coal, and the evidence had shown that eastern locomotives are less liable to cause damage by fire than western locomotives, or that anthracite coal is less dangerous than any other coal, there would have been a clear analogy to the case at bar.

(B.) In *Fidelity Mutual Life Association* v. *Mettler*, 185 U. S., 308, there was drawn in question the constitutionality of a statute of Texas which provided that life and health insurance companies who shall default in the payment of their policies within the time therein specified and after demand made therefor shall pay 12 per cent. damages, together with reasonable attorney's fees. The statute further provided that it shall not apply to mutual benefit organizations doing business in the state through lodges or councils, or to mutual relief associations which have no capital stock and whose relief funds

are created and sustained by assessments made upon the members of such associations in accordance with their several by-laws and regulations. In deciding the question, Mr. Chief Justice FULLER, in delivering the opinion of the court, said that the reasoning in the *Matthews* case applied rather than that in the case of *Gulf, etc., R. Co.* v. *Ellis*.

That claims for losses under life and health insurance policies are of a special and peculiar nature, rather than of the colorless type of debts dealt with in the *Ellis* case, needs no argument. Nor was it contended in the *Mettler* case that the statute was unconstitutional in not providing for similar damages and attorney's fees in *all* cases of successfully prosecuted claims of every character or description. The contention was that there was an unjust discrimination between life and health insurance companies conducted on the stock plan or for profit on the one hand, and mutual benefit and relief associations as well as fire, marine and inland insurance companies on the other hand. Upon this point the opinion says (p. 326):

> "The ground for placing life and health insurance companies in a different class from fire, marine and inland insurance companies is obvious, and we think that putting them in a different class from mutual benefit and relief associations doing business through lodges, and benevolent associations of the character mentioned in the Texas statutes, is not an arbitrary classification, but rests on sufficient reason. The legislature evidently intended to distinguish between life and health insurance companies engaged in business for profit (and we are not called on to refine as to the distribution of such profits) and lodges and associations of a

> mutual benefit or benevolent character, having in mind also the necessity of the prompt payment of the insurance money in very many cases in order to provide the means of living of which the beneficiaries had been deprived by the death of the insured."

The last words of this quotation indicate what was in the mind of the court in distinguishing between loss claims against life and health insurance companies on the one hand, and loss claims against other insurance companies on the other hand. Life and health insurance, in the generality of cases, is intended as a provision for the family in case he upon whom they depend for support dies or becomes temporarily disabled. Fire, marine and other insurance is, in the generality or at least the overwhelming majority of cases, intended to secure one against losses arising in the conduct of business.

In addition to this distinction it may be suggested that there is *no competition* between companies doing a marine or fire insurance business and companies doing a life or health insurance business. If the statute were to provide for damages and attorney's fees in claims against life insurance companies with a capital stock of $1,000,000 or over only, they could undoubtedly complain of a deprivation of property without due process and a denial of the equal protection of the laws, because they compete with life insurance companies having a smaller capitalization just as much as with life insurance companies having an equal or larger capitalization. In such a case the cost of carrying the risk would be increased to the companies subjected to the provisions of the statute. In the nature of things they

could not charge higher rates than the competing companies not subjected to the provisions of the statute, and therefore could not devolve this increased cost upon their customers. Thus they would be deprived of property to the extent of such increased cost and would be denied equality of protection with other companies in the same class. The same would be true if the statute provided for damages and attorney's fees against *foreign* insurance companies only; or only against life insurance companies which have been in existence ten years; or only against life insurance companies whose accumulated risks amount to more than a certain sum. But if the provision for damages and attorney's fees applies to *all* life insurance companies, though only to these, the increase in the cost of carrying risks affect equally all life insurance companies and would naturally result in a general increase of the rates whereby this increased cost would be devolved upon the insured. That there would be no similar increase in the cost of carrying the risk or in the rates of fire insurance companies is no cause of complaint on the part of life insurance companies because the amount of business done by a life insurance company does not depend upon the cost of carrying the risk or upon the rates charged by fire insurance companies. In other words, inasmuch as life and health insurance companies do not come in competition with fire, marine and inland insurance companies, they may properly be placed in a separate class with respect to the legislation in question.

Now, as to the difference between insurance companies conducted for profit and those conducted on

the lodge plan, it may be suggested that the latter usually collect by assessment among the members the amount necessary to pay a loss. No motive for the interposition of frivolous defenses or for captious delays in settling losses is likely to exist in the case of such fraternal associations as were justly supposed by the legislature to exist in the cases of regular insurance companies conducted for profit. The exemption applies only to such organizations as have no capital stock and whose relief funds are created and sustained by assessments made upon the members. It would undoubtedly be often a great hardship for such associations to be punished for a delay in settling a loss or paying a benefit, as such delay may be entirely beyond the control of the organization and the penalty would fall proportionately upon the members of the association, those who promptly pay their assessments as well as those who might be in default.

(C.) *Farmers' and Merchants' Insurance Company* v. *Dobney,* 189 U. S., 301, held valid a statute of Nebraska allowing a reasonable attorney's fee to the plaintiff in case of the successful defense by an insurance company of a suit on a policy of insurance covering real property which has been totally destroyed by fire, tornado or lightning. Referring to the previous decisions in *Orient Ins. Co.* v. *Daggs,* 172 U. S., 557; *Hancock M. L. Ins. Co.* v. *Warren,* 181 U. S., 73, and the *Mettler* case, 185 U. S., 308, the court found ample authority for classifying insurance contracts not only from other contracts but also as between themselves, "depending upon the nature of the insurance, the character of the prop-

erty covered, and the extent of the loss which may have supervened." Upon the subclassification between cases of total and cases of partial loss, the opinion delivered by Mr. Justice WHITE has this to say (p. 306):

> "The differences of relation which may arise between the insurer and the insured, depending upon whether the property insured has only been partially damaged or has been totally destroyed, needs but to be suggested. In the one case, the amount of the damage affords possibilities for a reasonable difference of opinion between the parties in adjusting the payment under the policy. In the other, the amount being determined under the statute by the value fixed by both parties in the policy, the question of legal liability under the policy would be, as a general rule, the only matter to be considered in determining whether payment under the contract will be made. Besides, it is obvious that the total destruction of real estate covered by insurance necessarily concerns the homes of many people of the state."

Here again, with a view to distinguishing this case from the case at bar, may we be permitted to offer a few suggestions. It may be admitted that the same insurance companies generally insure both buildings and personal property against loss by fire, tornado or lightning, so that all such insurance companies may be assumed to be in competition with each other. But the business of writing contracts for the insurance of buildings is not in competition with the business of writing contracts for the insurance of personal property. The two are independent and separate branches of the fire insurance business. The rates for insuring buildings are entirely

independent of the rates for insuring personal property. The Nebraska statute imposes a burden upon the business of insuring buildings and increases the cost of carrying such risks. But this burden is equally imposed upon all such insurance companies and can be and naturally is devolved upon the insured, even though there is no burden placed upon the business of carrying risks on personal property. The consequence of the statute is not that some companies insuring buildings will find themselves by reason of this statute under a burden which is not imposed upon other companies insuring buildings. In other words, there is no taking of property and no inequality of treatment. Were this burden placed only upon some companies writing such insurance and not upon other companies, then under the compelling law of competition the first mentioned group of companies could not devolve this burden upon the insured. Suppose, *e. g.*, that the statute had placed this burden upon companies whose contracts are printed, and not upon companies whose contracts are written; or that it had placed this burden upon companies if the contract is printed on ordinary paper, but not if the contract is printed on parchment, or *vice versa;* or that it had placed this burden upon companies whose stockholders are non-residents of the state, and not upon companies whose stockholders are residents, then there would be an analogy to the case at bar. In all of these cases (which in principle are like the arbitrary classifications of the North Dakota paint law) there would be a clear discrimination, an arbitrary selection, because in each of them the two ar-

tificially created classes would in reality belong to one class coming directly into competition with each other, and because the difference between them would bear no reasonable relation to any justifiable, legislative purpose.

As to that part of the statute by which its provisions are confined to cases of total destruction, it is clear that in the natural course of events and according to the doctrine of chance all insurance companies insuring buildings against loss by fire, tornado or lightning will have in the course of a year the same number of total losses in proportion to the total amount of building insurance written by them respectively. There is, therefore in this regard, no discrimination between different insurance companies.

3. Otis v. Parker.

In *Otis* v. *Parker*, 187 U. S., 606, it appears that the constitution of California prohibited all contracts for the sale of shares of the capital stock of any corporation on margin or to be delivered at a future day. It was contended that this prohibition unduly interferes with the freedom of contract, because it includes legitimate transactions as well as gambling deals, thus depriving persons of liberty and property without due process of law, and that it unjustifiably selected stock speculations and left untouched other forms of speculation as, for instance, in cotton or grain, thus denying the equal protection of the laws. Both contentions were denied.

As to the first contention the court held that it was proper for the state to entirely suppress a business, if it thought that an admitted evil connected with its conduct cannot otherwise be effectually prevented. As to the second contention it was held that, with reference to the evil of speculation, stocks were not in the same class in the State of California with cotton or grain or other objects of speculation. The opinion points out (p. 610)

> "that probably in California the evil sought to be stopped was confined in the main to stocks in corporations. California is a mining state, and mines offer the most striking temptations to people in a hurry to get rich. Mines generally are represented by stocks. Stock is convenient for purposes of speculation, because of the ease with which it is transferred from hand to hand, as well as for other reasons. If stopping the purchase and sale of stocks on margin would stop the gambling which it was desired to prevent, it was proper for the people of California to go no farther in what they forbade. The circumstances disclose a reasonable ground for the classification, and thus distinguish the case from *Connolly* v. *Union Sewer Pipe Co.*, 184 U. S., 540."

Of course, the business of dealing in stocks on margins is not in competition with the business of dealing in cotton or grain on margins. Moreover, for aught which appeared in that case to the contrary, speculation in cotton or grain may have been entirely unknown in California. If the constitution of California had prohibited speculation in the stocks of mining companies whose mines are equipped with air compressors, leaving untouched speculation in the stocks of corporations operating

mines without air compressors, there would then have been furnished an analogy to the case at bar, because in that case the difference between the two classes created would bear no reasonable relation to the purpose of the provision, which was not to prevent the use of air compressors, but to prevent speculation. In the case at bar, the purpose of the statute is to prevent deception in the sale of paints, which is easily practiced by reason of the fact that this article is sold in sealed packages. But inasmuch as paints made without the use of non-statutory ingredients is at least as liable to be worthless or lacking in efficiency as paint wherein a non-statutory ingredient is used, the reason for the law equally applies to both classes of paint created by the statute.

4. Missouri, K. & T. R. Co. v. May.

M., K. & T. R. Co. v. *May*, 194 U. S., 267, involved the constitutionality of a statute of Texas imposing upon railroad companies alone a penalty given to contiguous land owners for allowing Johnson grass to mature and go to seed. It was admitted by the company that Johnson grass is a menace to crops, that it is propogated only by seed, and that a general regulation of it for the protection of farming would be a valid exercise of the police power. The question, however, was as to the propriety of the classification. In the absence of any light given to the court on the subject of the reason for the discrimination (no counsel appearing in defense of the statute) the court assumed that it may have been

justified by local conditions. The court conjectured that it may have been found

> "that the seed of Johnson grass is dropped from the cars in such quantities as to cause special trouble. It may be that the neglected strips occupied by railroads afford a ground where noxious weeds especially flourish, and that whereas self-interest leads the owners of farms to keep down pests, the railroad companies have done nothing in a matter which concerns their neighbors only. *Other reasons may be imagined.*"

Among these other reasons which may be imagined is one which suggests itself to us most strongly and which places railroads absolutely in a class by themselves as regards the evil in question. It is common knowledge that trains of cars moving at a high rate of speed create near the ground strong currents of air, which are liable and most probably have been found to carry the seeds of Johnson grass beyond the rights of way of railroads. No such or similar condition exists on any other ground where Johnson grass seed is liable to be found. This difference furnishes a perfectly valid reason for singling out railroad companies, a reason arising from the peculiar dangers to contiguous property involved in the operation of railroads, thus bringing the case within the principle underlying the long line of decisions in which special laws with reference to railroads were upheld, some of which have been noted in connection with our consideration of the case of *Atchison, T. & S. F. R. Co.* v. *Matthews*, (pp. 238, 9, *supra.*)

We are entirely content to rest the case at bar

upon the principle formulated by Mr. Justice HOLMES, who in delivering the opinion of the court said (p. 269):

> "When a state legislature has declared that, in its opinion, policy requires a certain measure, its action should not be disturbed by the courts under the 14th amendment, unless they can see clearly *that there is no fair reason for the law that would not require with equal force its extension to others whom it leaves untouched.*"

The only fair reason for the requirement that certain paints be labelled is that purchasers of paints (which are sold in sealed packages and therefore cannot be inspected prior to the purchase) shall be apprised of their ingredients so that they may not be deceived into buying an article whose composition does not commend itself to their judgment. As we have seen that paints conforming to the negative standard of the statute are fully as liable to be of a composition which does not commend itself to the judgment of buyers, *it is clear that the only fair reason for the law requires with equal force its application to the exempted class of paints.*

5. Cox v. TEXAS.

In *Cox* v. *Texas,* 202 U. S., 446, an attack was made upon the constitutionality of certain statutes of Texas referring to "sellers of spirituous, vinous or malt liquors or medicated bitters." The statutes provide for taxes on such sellers, require an application for a license, a payment of the annual tax as a condition of obtaining such license, and, *in the case of retail liquor dealers,* the giving of a bond

conditioned among other things against selling intoxicating liquors to minors or allowing minors to enter and remain in the obligor's place of business. Suits were brought upon such bond of a retail liquor dealer, the breaches found being that he sold intoxicating liquors to a minor and allowed a minor to enter and remain in his place of business. *It appears from Cox* v. *Thompson*, 85 S. W. R., 34, *which is the very judgment affirmed in* 202 U. S., 446, *that Cox kept a saloon.*

The statutes above referred to enact that the provisions thereof shall not apply to wine produced from grapes grown in Texas while the same is in the hands of the producers or manufacturers thereof. It was this latter provision which was thought by the plaintiff in error to invalidate the entire liquor law as involving a denial of the equal protection of the laws, reliance being placed upon *Connolly* v. *Union Sewer Pipe Company*, 184 U. S., 540.

In the opinion of the court by Mr. Justice HOLMES the soundness of the latter decision was not questioned in the least, but the two cases were distinguished as follows (p. 450):

> "Farmers and stock raisers are classes naturally existing in the community, carrying on distinct callings, and not likely to be engaged in anything else. Hence, although farmers and stock raisers equally with others were prohibited from forming trusts for other purposes, to permit them to form trusts in their regular business was practically, and in fact, to discriminate between two classes and others. The case was discussed throughout on the footing of classification. But, so far as we know, there is no natural distinction of classes among liquor

> sellers,—one class selling their own domestic wines alone, another selling all intoxicants except domestic wines. The statutes regulate the doing of certain things, which, presumably all liquor sellers would prefer to be free to do. Therefore, whatever other objections there may be to them, they do not deny the equal protection of the laws by forbidding, without justification, to one what they permit to another class."

In other words, the court very justly declined to assume that there were some persons maintaining saloons for the sale only of domestic wines of their own respective manufacture.

While there may be and probably are in the State of Texas persons who sell wines produced by themselves from native grapes and no other liquors, it is inconceivable that this business is conducted in such a way that the wine sold is "drunk on the premises." The requirement of a bond such as was sued upon in the *Cox* case does not, however, apply to liquor sellers generally, but applies only to establishments for the sale of intoxicating liquors "to be drunk on the premises." In other words, *it applies only to saloons and to restaurants maintaining bars.* Any possible doubt about this is removed by the provision that the establishment must be an "open, quiet and orderly house or place," and by the minute definitions of these terms found in the section which provides for retail liquor dealers' bonds. In other words, the bond is intended to secure the running of *saloons* and *bars* in an orderly manner, keeping out minors and habitual drunkards, etc.

Now if a producer of domestic wine should have a place of business wherein he sells the same *and*

no other liquors, such a place would in the nature of things be one for the wholesale or bottle trade where liquors are not drunk on the premises; a warehouse rather than a bar room; a store or an office rather than a saloon. The reasons for requiring a bond intended to secure the orderly running of saloons have not the remotest application to such a place of business, such a warehouse or store or office as would naturally be kept by a person selling only native wine of his own production.

If on the other hand a producer of domestic wine should not confine himself to the sale of his own products, but should also engage in the sale of other intoxicating liquors and keep a place where the liquors sold are drunk on the premises, he would then have to give the bond provided by the statute and therefore would be treated the same as all other saloon keepers. A person selling domestic wine of his own production and also other liquors is not required to give a separate bond with reference to the sale of such other liquors and exempt from this requirement with reference to the sale of native wine of his own production. The bond refers generally to the conduct of the place of business where liquors are sold to be drunk on the premises. The requirement of the bond is not a burden laid upon any particular kind of liquor, but upon the *occupation* of selling liquor in saloons or restaurants.

The fact of the matter is that the *real* exemptions of "wine produced from grapes grown in Texas while the same is in the hands of the producers or manufacturers thereof" are only from those pro-

visions of the statute which require the payment of certain *taxes* and the obtaining of a *license*. The exemption from the requirement to give a saloon keeper's bond is *not real, but purely formal*. For the legislature must have known what any person who keeps his eyes open knows, that a wine grower does not keep a saloon for the sale of the wine of his own manufacture and of no other intoxicating liquor, and that a saloon keeper does not confine himself to the sale of wine, let alone native wine of his own manufacture.

The question whether what we have called the real exemptions, that is to say, the exemptions from the payment of taxes and from the requirement to obtain a license, violate the 14th amendment, was not involved in the *Cox* case. Nothing else was involved in that case, except the validity of so much of the statute as required a bond from retail liquor dealers or saloon keepers for the orderly conduct of their places of buiness. This provision is entirely *separate* and *separable* from the provisions for taxation and those requiring an application for a license. That some other provision in the same chapter of the Texas statutes might possibly be unconstitutional had nothing to do with the question as to whether the bond sued upon was valid. Cox was not sued for the non-payment of taxes. He was not sued for selling liquor without a license. He was sued for the breach of a bond which is not required of liquor sellers generally, but only of those who sell intoxicating liquors to be drunk on the premises.

If the Texas statute had in so many words exempted native wine in the hands of the producer *only* from the provisions regarding taxation and the necessity of a license, without mentioning or including in the exemption the requirement of a saloon keeper's bond, it would have had the same practical effect as the provision which in general language exempts such wines from *all* the provisions of the statutes. It is in effect the same as though the statute had said that the provision for a bond to be given by persons engaged in the sale of intoxicating liquors to be drunk on the premises, shall not apply to persons engaged in the sale of intoxicating liquors not to be drunk on the premises.

In order that the principle of the *Cox* case should apply to the statute in the case at bar, it would first have to appear that there are no manufacturers whose mixed paints sold in North Dakota contain only such ingredients as are enumerated in the statute. *The contrary, however, affirmatively appears in this case.*

But there is still another distinction. The requirement of the Texas statute for the giving of a bond is a regulation of the conduct of an *establishment.* If a saloon keeper who promiscuously sells intoxicating liquors should sell to a minor *native wine of his own production,* the character of the liquor sold in that case would be no defense to a suit on the bond. The requirement of the bond is not a burden laid upon any particular kind of liquor, but upon the occupation of selling liquor in saloons or at bars. Under the paint statute of North Dakota, however, *the burden is not laid upon the*

business of the paint manufacturer or paint seller generally, but upon each separate can of paint coming under the provisions of the statute. Even if it had appeared, therefore, that each paint manufacturer doing business in the State of North Dakota sells there both statutory and non-statutory paints, still, if one manufacturer's business were made up of ten per cent. of statutory and ninety per cent. of non-statutory paints, and another manufacturer's business were made up of ninety per cent. of statutory and ten per cent. of non-statutory paints, the first named manufacturer would be unjustly burdened in eighty per cent. of all the goods sold by him as compared with the burden laid upon the second manufacturer. In order that a governmental regulation may be held to be subject to the charge of unjust and unreasonable discrimination, it is not necessary to show that a burden is thereby laid altogether upon one person and that another person in the same class is altogether free from it. It is sufficient if it be shown that the burden does not equally or proportionately fall upon two persons of the same class.

K. The Remedy.

Any discussion of the remedy is necessarily based [illegible]tion of the unconstitutionality of the statute. Assuming, therefore, that the law is unconstitutional, it is mere *brutum fulmen.* It need not be obeyed by the complainants. Any act done by way of enforcing it is done without authority.

The defendant who is charged with the enforce-

ment of the law had prior to the filing of our bill threatened to enforce, and was about, by himself, his assistants, experts and agents, to enforce all the provisions of said act, and to exercise all the power conferred upon him and them by said act. (Paragraph 13 of bill, admitted by demurrer; Trans., 10.)

For the character and extent of the injury thus threatened to the complainants, we beg to refer the court to Chapter G of our Statement of the Case (p. 38, *supra*), from which it appears that the enforcement of the statute would mean a vast multiplicity of criminal and civil suits and the utter destruction of the complainant's trade in the State of North Dakota. Under such circumstances there is no adequate remedy except an injunction to restrain the enforcement of the invalid statute.

In *Smyth* v. *Ames*, 169 U. S., 466, there came under review an act of the State of Nebraska "to regulate railroads, classify freights, fix reasonable maximum rates to be charged for the transportation of freights upon each of the railroads in the State of Nebraska, and to provide penalties for the violation of this act." By this act the Board of Transportation of the State of Nebraska was given authority to reduce rates and to revise the classifications of freight established by said act. In case of such a reduction of rates or revision of classification, the Board was required to cause to be published a notice stating the date when such change should take effect. For any charge by any railroad in excess of a rate established under authority of the act, civil remedies and criminal prosecutions were provided.

The Circuit Court, Mr. Justice Brewer presiding, on the complaint of certain aggrieved railroad companies, issued a perpetual injunction which provided, among other things, that the Board of Transportation be enjoined from entertaining, hearing or determining any complaint against the companies for any act or omission contrary to the provisions of said statute, "and *from instituting or prosecuting, or causing to be instituted or prosecuted, any action or proceeding, civil or criminal,* against either of said companies or their receivers, for any act or thing done, suffered, or omitted, which may be forbidden or commanded by said act." The attorney general of the state, who was *ex-officio* a member of the Board of Transportation, was "in like manner enjoined from bringing, aiding in bringing or causing to be brought, any proceeding by way of injunction, mandamus, civil action, *or indictment* against said companies," for any such action or omission. *This decree was affirmed by this court.*

The statute gave railroads a remedy against unreasonable action by the Board in the form of an action in the Supreme Court of the state, which was given authority to command the Board of Transportation to restore rates unjustly reduced. It was contended that this remedy deprived a court of equity of jurisdiction. But this court held that the remedy provided was inadequate and that the Federal Circuit Court had not been ousted of its equity jurisdiction. Upon the question of the proper remedy, the court, speaking by Mr. Justice HARLAN, said (p. 517):

"In these cases the plaintiffs, stockholders in the corporations named, ask a decree enjoining the enforcement of certain rates for transportation upon the ground that the statute prescribing them is repugnant to the Constitution of the United States. Under the principles which in the federal system, distinguish cases in law from those in equity, the Circuit Court of the United States, sitting in equity, can make a comprehensive decree covering the whole ground of controversy and thus *avoid the multiplicity of suits* that would inevitably arise under the statute. The carrier is made liable, not only to individual persons for every act, matter or thing prohibited by the statute, and for every omission to do any act, matter or thing required to be done, but to a fine of from one thousand to five thousand dollars for the first offense, from five thousand to ten thousand dollars for the second offense, from ten thousand to twenty thousand dollars for the third offense, and twenty-five thousand dollars for every subsequent offense. The transactions along the line of any one of these railroads, out of which causes of action might arise, under the statute, are so numerous and varied that *the interference of equity could well be justified upon the ground that a general decree, according to the prayer of the bills, would avoid a multiplicity of suits, and give a remedy more certain and efficacious* than could be given in any proceeding instituted against the company in a court of law; for *a court of law could only deal with each separate transaction* involving the rates to be charged for transportation. The transactions of a single week would expose any company questioning the validity of the statute to a vast number of suits by shippers, to say nothing of the heavy penalties named in the statute. Only a court of equity is competent to meet such an emergency and determine, once for all and without a multiplicity of suits, matters that

> affect, not simply individuals, but the interests of the entire community as involved in the use of a public highway, and in the administration of the affairs of the quasi-public corporation, by which such highway is maintained."

To the same effect are *Cleveland* v. *Cleveland City R. Co.,* 194 U. S., 517, and *Detroit* v. *Detroit Citizens' Street R. Co.,* 184 U. S., 368.

In the case at bar the manufacture or sale or exposing for sale of each separate gallon or quart or pint can of unlabeled mixed paint containing an ingredient not enumerated in the statute would give rise to a separate criminal prosecution of the complainant's distributing agents, salesmen, or dealers. The dealers moreover would decline to pay for their purchases upon the ground that the complainants in selling their goods without labels had been guilty of an illegal act, thus leading to civil suits. The transactions of a single week would expose any of the complainants or their agents or dealers to a vast number of criminal and civil suits.

In *Dobbins* v. *Los Angeles,* 195 U. S., 223, it appears that one Caroline Dobbins was, through her contractors, erecting gas works upon lands owned by her in the City of Los Angeles. After the foundations had been nearly completed, the City Council passed an ordinance whereby they limited the boundaries within which gas works may be erected so as to include the land in question within the prohibited territory. For reasons which it is not pertinent to notice in this connection, this court held that the ordinance was invalid as to Mrs. Dobbins, in that it had the effect of depriving her of property

without due process of law. Acting upon her belief in the invalidity of the ordinance, Mrs. Dobbins continued to prosecute the work of constructing the gas works through her contractors. The City of Los Angeles, however, caused, on several occasions, the arrest of employes of the contracting concern engaged in the erection of the gas works, charging them with the violation of the ordinance in question. Mrs. Dobbins thereupon filed a bill of complaint against the City of Los Angeles, seeking an injunction to restrain the enforcement of the ordinance. Upon demurrer to the bill the same was dismissed for want of equity. This decision was affirmed by the Supreme Court of California. But this court reversed the judgment of the Supreme Court of California, holding that the ordinance was void as to Mrs. Dobbins, and that the case stated by the bill called for the application of the remedy by injunction. In the unanimous opinion of the court, prepared by Mr. Justice DAY, it was said (p. 239):

> "Being the owner of the land, and having partially erected the works, the plaintiff in error had acquired property rights, and was *entitled to protection against unconstitutional encroachments which would have the effect to deprive her of her property without due process of law.*"

The point having been made that a bill in equity will not lie to enjoin the enforcement of a law or ordinance by criminal prosecutions, this court said (p. 241):

> "It is also urged by the defendants in error that a court of equity will not enjoin prosecution of a criminal case; but, as we have seen,

> the plaintiff in error in this case had acquired property rights which, by the enforcement of the ordinances in question, would be destroyed and rendered worthless. If the allegations of the bill be taken as true, she had the right to proceed with the prosecution of the work without interference by the city authorities in the form of arrest and prosecution of those in her employ.
>
> It is well settled that, *where property rights will be destroyed, unlawful interference by criminal proceedings under a void law or ordinance may be reached and controlled by a decree of a court of equity.*"

It should be noted that the ordinance involved in the Dobbins case did not authorize the *seizing* of any property lying within the prohibited territory if used for the conduct or erection of gas works. Nor was the physical property of Mrs. Dobbins seized or even touched. Nor was she personally arrested. But *the repeated arrests of the* **employes** *of her contractors engaged in the erection of the works interfered indirectly, but most effectually, with the enjoyment of her property rights.* Likewise in the case at bar, criminal prosecutions against the distributing agents and salesmen or customers of the complainants (together with refusals of their customers to pay for goods sold to them by the complainants) will indirectly, but most effectually destroy the value of complainants' goods and outstanding accounts and their entire trade in North Dakota and thus deprive them of their property without due process of law.

The case at bar is very much stronger than the Dobbins case. In the latter there was *only one per-*

son whose rights were to be invaded by repeated criminal prosecutions of her employes. In the case at bar, however, there are *many complainants* whose rights are similarly to be invaded. In the Dobbins case the question of the constitutionality of the ordinance could easily have been tried in any one of the criminal prosecutions. In the case at bar the question of the constitutionality of the statute depends upon a nice construction of its provisions, as well as upon a consideration of the complex state of facts which it has required more than six hundred closely typewritten pages of expert testimony to make clear. Only a court of equity is a competent tribunal to adequately deal with such a situation by declaring the law unconstitutional and enjoining its enforcement. In no other way can great and irreparable injury to the complainants and a vast multiplicity of criminal and civil suits be prevented.

In *Jewett Bros. & Jewett* v. *Smail*, 105 N. W. R., 738, the Supreme Court of South Dakota affirmed an order for an injunction restraining the Food and Dairy Commissioner of the state from enforcing certain criminal provisions of the Pure Food Law of the state. The allegations as to the injury threatened to the complainant through an enforcement of the statute are very similar to those in the case at bar. On the question of the equitable jurisdiction, the court said (p. 740):

> "Assuming the well-pleaded allegations of the complaint to be true, it clearly appears that the plaintiff has such an interest in the enforcement of the statute as entitles it to attack its validity, and that a court of equity has authority to enjoin its enforcement, if it be unconstitutional, for the purpose of avoiding a multiplicity of suits, and because the plaintiff has no adequate remedy at law."

CONCLUSION.

We do not ask to have the North Dakota paint statute declared unconstitutional, merely because it is foolish, or because it is based upon antiquated superstitions, or because it ignores the scientific progress of the last fifty years in the technology of paint-making. We fully recognize that with the mere wisdom of an enactment the courts have no concern. But we ask to have this statute declared unconstitutional, because its classification of mixed paints is without a semblance of reason; because no fair reason exists why the mixed paints discriminated against should be labeled which does not apply with at least equal force to the mixed paints exempted from the provisions of the statute; and because it imposes upon the progressive and up-to-date manufacturer financial burdens which deprive him of the opportunity of fair competition with the manufacturer who clings to the methods of the great-grandfathers. A law which in the interest of fair dealing with the consumer should require the labeling of *all* paint would be a valid exercise of the police power. But the police power is decidedly made to work overtime when it is invoked in defense of a statute which—apart from exempting paste paint—requires the labeling of mixed paint, if in its manufacture the achievements of modern science are availed of, and exempts from this requirement all those mixed paints which conform to the *fiat* standard of the statute—a standard which, apart from its unjust exclusiveness, is purely negative

and therefore so vague and uncertain as to include innumerable varieties and degrees of poor paint.

No enactment like this paint statute has ever come under consideration by this court. And it is confidently asserted that no enactment similar to it in principle has ever been upheld by any American court of last resort. It presents a departure of striking originality. Never before was it attempted with reference to such an artificial compound as paint, which is not intended as food or drug, which can be made equally good by the use of many different ingredients in different proportions, and for which there is no natural nor even, in the minds of consumers, a widely accepted standard of composition, to select by statute a limited number of the properly usable ingredients and allow the use of others only upon onerous conditions.

To hold that such an outrage upon reason and justice and on the constitutional principles of equality is a valid exercise of the police power would be to open the floodgates of legislative absolutism. Yesterday it was an arbitrary classification of paint. To-morrow some legislature will ignorantly discriminate against Portland cement and in favor of the much inferior natural cement. Day after to-morrow a soap law will be passed which will impose a burden upon the manufacturer who uses caustic soda, the best alkali available, and exempt from this burden the manufacturer who uses less efficient ingredients. Next day some ignorant legislature will provide that glass, unless made from crushed flint or quartz (as it was exclusively made fifty years ago), must be labeled, thus imposing a burden upon the

vastly better glass made, according to more modern methods, from white sand. Statutes like these would not be more foolish or unjust than the paint law of North Dakota. Nor would the enactment of such statutes be improbable in an age of legislative prodigality which has provided us with regulations of every conceivable subject, including the length of hotel bed sheets and the color of overalls, and would, if it could, regulate the number of pulse beats.

We most respectfully submit that due regard for the sacredness of constitutional guarantees demands that the statute in question be declared invalid and that the decree of the Circuit Court be reversed.

SIGMUND ZEISLER and
HENRY L. STERN,
Attorneys for Appellants.

IN THE

Supreme Court of the United States.

OCTOBER TERM, A. D. 1907.

HEATH & MILLIGAN MANUFACTURING COMPANY *et al.*, Appellants, *vs.* J. H. WORST, Director of the North Dakota Government Agricultural Experiment Station, Appellee.	Appeal from U. S. Circuit Court for the District of North Dakota.

REPLY BRIEF FOR APPELLANTS.

May it Please the Court:

Appellee's brief contains a number of misleading statements for the correction of which we do not feel safe in relying upon the volatile effect of spoken words. Hence we beg leave to submit this reply.

A. Misstatements and Misleading Statements of Fact.

1. Counsel say (Appellee's Brief, p. 6):

"It is not denied there were great evils present in the sale of *mixed paints* and which were sought to be corrected by the legislation in question. An analysis of the paints appearing upon the market such

as " *White Lead*" showed the actual percentage of that pigment to range as low as 3.34 per cent., while barytes appeared in varying proportions, in some as high as 99.28 per cent. (90). According to trade literature some packages labelled ' Pure White Lead ' did not contain a trace of that pigment (80)."

To which we reply as follows:

(*a*) The assertion that there were great evils present in the sale of *mixed* paints is certainly not proved by the analyses of samples of " White Lead " to which counsel refers. " White Lead " is not mixed paint. " White Lead " is separately treated by a provision in the first part of the statute—a provision which is free from objection, because it requires that *all* white lead, or compounds intended for use as such, be labeled so as to " show the true per cent. of *each* mineral constituent contained in said paint." The evil of misbranding substitutes for " White Lead " is not even remotely touched by the provision respecting mixed paints, which is the only one we have attacked.

(*b*) Counsel misquote the record in claiming that one of the samples of white lead analyzed showed the presence of 99.28 per cent. of barytes. The only sample the analysis of which shows the figure 99.28 is a sample of Carter lead. This, however, shows 99.28 white lead, and not 99.28 barytes (Trans. 58; Rec. 90).

(*c*) The trade literature to which counsel refer is an alleged quotation in Professor Ladd's bulletin from some unnamed, undated and not otherwise identified enunciation purporting to emanate from the National Lead

Company (Trans. 50; Rec. 80), the concern which has an interest in suppressing all pigments other than carbonate of lead. Under what rule of law this alleged quotation can be given the dignity of evidence is not apparent. Moreover, it does not refer to *mixed* paint.

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2. Appellee's brief (p. 6) refers to the presence of water in some samples of paint. Whether or within what limit the use of water may be of value in paint was not one of the issues in this case. Assuming that it is entirely valueless, the facts referred to by counsel might justify a statute which would prohibit the use of water in paint, except upon condition of its being disclosed on a label, but have no tendency to justify and have absolutely no relation to the discriminations against Class "A" and Class "B" pigments and against varnish.

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3. The statement of appellee's counsel (p. 6) that "complainants' witnesses frankly admitted the evils of adulteration in the preparation of mixed paints," is misleading because it tells only a part of the truth. The balance of the truth is that while complainants' witnesses frankly admit that Class "B" pigments are often used in excess of the limit of usefulness, they refer with equal emphasis to the fact that oxide of zinc, which is sanctioned by the statute, is likewise often used in excess of the limit of usefulness.

Another part of the truth, not apparent from counsel's statement, is that *neither complainants' witnesses, nor any*

other witness, admitted or claimed that any of the Class "A" pigments or that varnish is ever used as an adulterant.

Referring to the fact pointed out by us in our main brief that under the statute paint need not be labeled although it contained too great a proportion of oxide of zinc, or although oxide of zinc were the only white pigment used, counsel say (Appellee's Brief, p. 86):

> "It is perhaps sufficient to say no such evil is shown to have existed in North Dakota. It does not appear that oxide of zinc has been used to any undue excess or as an adulterant."

The reverse of this statement appears from the table of analyzed paints on page 155 of our main brief, which shows that *in the mixed paints sold in North Dakota the excessive use of oxide of zinc is more frequent than the excessive use of Class "B" pigments.*

Counsel further say (Appellants' Brief, p. 87):

> "In any event oxide of zinc is a very much more expensive pigment than any of those named in Class 'B.' If used to excess in combination with carbonate of lead, the product would still cost the manufacturer much more than if a like percentage of Class 'B' pigments was similarly employed."

This statement is misleading, because the statute does not discriminate only against Class "B" pigments. *It discriminates equally against Class "A" pigments.* And while it is true that oxide of zinc is very much more expensive than any of the Class "B" pigments, it is likewise true that it is cheaper than several of the Class "A"

pigments. It is cheaper than sublimed lead, cheaper than the best qualities of lithopone; only slightly more expensive than zinc lead white; somewhat cheaper in the east, though somewhat dearer in the west, than zinc from western ores, freight rates alone causing this difference.

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4. Counsel say (Appellee's Brief p. 62) that "it appears that mixed paints were being offered for sale, labelled as pure white lead, in which there was no trace of such pigment." This is merely a reiteration of a similar allegation in defendant's answer to the bill of complaint.

The reply to this incorrect statement is made on pages 180 and 181 of our main brief.

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5. For the purpose of minimizing the recognition accorded to sublimed lead by paint manufacturers and users, counsel make the statement (Appellee's Brief, p. 67) that—

> "Dr. Dudley, controlling the purchase annually of a million dollars worth of paints and painting material, convinced of the superiority of sublimed white lead over the statutory pigments, has *yet never drawn a specification requiring its use in the paints which his company may purchase.* He speaks of the pressure of more important work as explaining why such specifications have not been prepared."

An adequate reply to this statement is to quote from the testimony of Dr. Dudley (Rec., 137–8; Trans., 88–89).

> "Q. Well, in the specifications as far as you have prepared them, have you universally required the use of some percentage of sublimed lead?

A. We have not.

Q. Have you in any case required it?

A. We have not.

Q. Then if we judge of the value and desirability for useful purposes of sublimed lead in admixture with other pigments in the preparation of paint by the use or non-use of the same by your railroad company, we would conclude that it is not a very desirable ingredient, would we?

A. I do not think you would be entitled to that, as *we have not yet prepared any specifications involving the use of* **statutory pigments** *either.* The question is under investigation. I think that I have already stated that we have not reached a final conclusion yet.

Q. Then is sublimed lead a pigment of such comparatively new and recent use in the evolutionary process of the manufacture of paint that the Pennsylvania Railway Company, with the great chemical department controlling that part of its business, has not yet found it advisable or desirable to specify it as an ingredient?

A. That would hardly be the correct statement of the case. *The reason why the specifications involving either* **statutory pigments** *or sublimed white lead have not yet appeared is simply the pressure of other work,* more important work, especially where safety is involved, and the chemical department is more than loaded with work at the present time, and the effort has not yet sufficed to reach this feature."

In answer to the labored efforts of counsel to belittle the extent of the use and recognition of the Class "A" and Class "B" pigments (Appellee's Brief, p. 68), we beg to refer the court to the collection of the evidence upon

this subject in our main brief (pp. 124 to 130). The fact that Dr. Dudley, though always insisting upon the admixture of Class "B" pigments where the statutory pigments are used, and never objecting to the use of Class "A" pigments in the mixed paints bought for the Pennsylvania Railroad, has not yet prepared a specification calling for sublimed lead (or of the statutory pigments either); the further fact that Mr. Toch, during a number of years, found it of advantage to use zinc lead white (which is also a Class "A" pigment) rather than sublimed lead; and the fact that Mr. Patton, a young man recently out of college (Rec. 353; Trans. 207), though using Class "B" pigments in his highest quality of mixed paints (Trans. 61; Rec. 93), and though using all Class "A" pigments in his *paste* paints (Trans. 201; Rec. 342), does not as yet use sublimed lead in his *mixed* paints, but is conducting tests with a view to satisfying himself, by his own actual experience, of the merits of this pigment for use in mixed paint, fall far short of supporting the insinuation of counsel that complainants' witnesses do not practice what they preach, and of proving that the statutory pigments deserve preferential treatment. The widened range of white pigments has given the manufacturer a comparatively large field to choose from. Probably no single manufacturer uses every one of the available pigments, and there is certainly no use for more than a limited number of the available pigments in any one brand of paint. Nothing is proven for the contentions of appellee by showing that some manufacturers do not use sublimed lead. We have, however,

affirmatively proven that a large majority of the 100 leading manufacturers do use this splendid pigment.

That there is no such cleavage, as counsel for appellee insist, between manufacturers who insist that the Class "A" and Class "B" pigments are valuable and other manufacturers who insist they are not valuable, but the cleavage is merely between manufacturers who have tested these pigments and found them valuable and others who have not tested them and therefore know nothing about their value, we have shown in our main brief (pp. 171 to 174.)

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6. The quotation from Church on the Chemistry of Paints and Painting (Appellee's Brief, p. 66) as to the merits of white lead is misleading, because Mr. Church's work *does not deal with industrial paints, but with artists' tube colors* (Rec., 524–5; Trans., 299). That different criteria apply to the merits of pigments for use in industrial paint than to pigments when used in colors for oil paintings, needs but to be suggested. Industrial paint is intended to withstand the destructive influence of weather conditions. Oil paintings are always protected by a coat of varnish, are hung on walls on the inside of buildings, and are not ordinarily subjected to a scrubbing process, like painted interior walls or woodwork.

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7. Counsel refer to the existence of a controversy touching the question whether a substance used as a pigment in the preparation of mixed paint should or should not be inert to linseed oil. They say (Appellee's Brief, p. 69):

"The advocates of carbonate of lead ascribe to that material as a virtue a close chemical union which it forms with oil; it is claimed that this chemical affinity or union of the lead and oil imparts a toughness and elasticity to the paint, and tends to give it the quality of durability. On the other hand Dr. Dudley, Mr. Toch and Mr. Lane contend that Class 'A' and Class 'B' pigments being inert to oil and forming no chemical union with it, are, by virtue of that fact, of far greater efficiency when used in the preparation of mixed paint.

It cannot be contended that this controversy does not exist or that either scientific writers or the paint manufacturers themselves are agreed as to which contention is right; it is plainly evident that time alone will determine which theory is the proper one; it is scarcely reasonable to expect that these questions could be satisfactorily determined within the short period during which at least three of the substituted Class 'A' pigments have been upon the market as commercial products.

All these facts must be presumed to have been known to the legislature of North Dakota."

We shall not re-examine into the claim of the advocates of carbonate of lead, that the close chemical union which that material forms with oil is a virtue. We have shown in our main brief that this claim is based purely upon theory (Appellants' Brief, p. 77); that in practice this chemical combination results in decomposition of both the oil and the carbonate of lead and in the paint thus "going to pieces" (Appellants' Brief, pp. 73 to 76); that hundreds of actual tests have absolutely demon-

strated the fallacy of this theory (Appellants' Brief, pp. 146 to 148).

But even if this theory were correct beyond controversy, still *it is not claimed to apply to any other pigment than carbonate of lead.* **It does not apply to oxide of zinc.** This is shown by the very authorities upon which appellee relies. Professor Hurst, in the passage quoted in Appellee's Brief (p. 66), says:

> "This fact of the white lead forming a chemical combination with the oil is well known to color makers who have endeavored by the addition of basic bodies to bring about a similar action with other white pigments, such as *zinc white* and barytes, but so far without any great success."

The fact that oxide of zinc, notwithstanding it does not possess the quality of forming a chemical union with linseed oil, is one of the white pigments sanctioned by the statute, conclusively shows that the failure of the Class "A" and Class "B" pigments to possess this alleged virtue cannot have been in the minds of the legislature as a ground for discriminating against them. If the presence of a Class "A" or Class "B" pigment in mixed paint would justify the requirement of a label upon the ground that such pigments do not form a chemical combination with the linseed oil, the use of oxide of zinc in mixed paint would present the same reason for requiring it to be labeled.

B. Erroneous Propositions in Appellee's Argument.

Counsel's entire argument rests upon several erroneous propositions which likewise form the basis of the opinion of the learned judge who decided the case in the court below.

Erroneous Proposition No. 1.

Counsel say (Appellee's Brief, p. 71):

> "It is right the law should say, as it does, to every intending purchaser of mixed paint, if there is no label the paint is composed alone of the old pigments, time-tried, and which you have always known, lead and zinc."

Judge Amidon's opinion says (Appellee's Brief, p 53):

> "The primary object of the act is to compel *every package* containing mixed paint to proclaim the ingredients of which it is composed. A package containing mixed paints composed of the ingredients named in the statute need not be labeled, but such a package, when considered in connection with the statute, of which all must take notice, announces its contents as truly as if it were labeled."

The fallacy of this proposition has been demonstrated in our main brief. We refer to pages 12 to 14; 192 to 195; 235–6. Indeed, it appears upon the face of the statute that it fails to require that all permissible ingredients be used, and fails to prescribe maximum and minimum percentages for mixed paints which may go unlabeled. An unlabeled package may, therefore, be any one of tens of thousands of combinations in differ-

ent proportions of either all six, or of only five, or of only four, or of only three, or of only two of the specified ingredients.

We entirely agree with the following statement of counsel (Appellee's Brief, p. 71):

> "The purchasing public is directly and vitally interested both in the quality and cost of the paint it buys. It is right an intending purchaser be enabled to act intelligently, both in the matter of choosing the kind of paint he buys and also in escaping fraud and imposition."

The truth of this statement, however, applies equally to mixed paints which under the statute need not be labeled. It is right, even in the case of mixed paint containing none but statutory ingredients, that an intending purchaser should be informed as to whether the paint he buys contains carbonate of lead and oxide of zinc combined in proper proportions, or whether one of these unduly preponderates, or whether one or another of these is not entirely absent. He is entitled to know, if such be the fact, that there is an unduly large portion of liquids in the mixed paint, or an unduly small amount of linseed oil, or an unduly large amount of turpentine or Japan dryer. Unless he is informed by a label which of the allowable ingredients have been used and in what percentages they are combined, he can make no intelligent choice. The absence of a label under the North Dakota statute *does not tell a purchaser what is in the paint, but simply what is not in the paint.*

ERRONEOUS PROPOSITION No. 2.

Appellee's counsel have argued this case throughout upon the basis of the proposition that the statute contains merely a classification of *pigments*. This is only a small part of the truth. It is true that the classification of the statute is based in part upon a classification of the white pigments into two groups: carbonate of lead and oxide of zinc on the one hand, and all other white pigments on the other hand. But the statute does not say that certain *pigments* need not be labeled and that all other *pigments* must be labeled. It says that one class of *mixed paints* need not be labeled and that all other *mixed paints* must be labeled.

No matter what differences may be found to exist between the various groups of *pigments*, the classification of *mixed paints* made by the statute cannot be justified, because every legitimate reason for requiring the labeling of the mixed paints discriminated against applies with equal force to the mixed paints exempted from this requirement. We beg to refer upon this point to Chapter F of our argument (Appellants' Brief, pp. 187 to 197).

ERRONEOUS PROPOSITION No. 3.

Appellee's counsel say that carbonate of lead and oxide of zinc "are the pigments people have always had in mind when thinking and speaking of paint." (Appellee's Brief, p. 72).

Again they say (Appellee's Brief, p. 73):

> "The law ascribes no superiority to the unlabeled article. It is composed of substances long used to

make the product, substances with which *all users of paint* are familiar. These ingredients, united with oil, are paint, according to the common understanding of that term."

The fallacy of this proposition has been demonstrated in Chapter "F" of our argument (Appellants' Brief, pp. 187 to 191) and again in our consideration of the Oleomargarine cases (Appellants' Brief, pp. 238 to 236).

Manufacturers of paint and possibly *job painters* may in olden times have had carbonate of lead, and later on that and oxide of zinc, in their minds as the sole white pigments entering into paint. Even as to the generality of manufacturers and job painters this has not been true for more then twenty years. But this statute cannot be construed as intended for the protection of the *manufacturer* who makes the paint, or the *job painter* who makes his own mixing. Mixed paint is an article intended for the use of the householder. We venture to say that not one out of ten thousand householders, apart from the prejudice created by this statute, would know the difference between white lead and sublimed white lead, or between carbonate of lead and sulphate of lead, or between oxide of zinc and zinc from western ores. Still rarer would be the householder who would have in his mind the idea that carbonate of lead and oxide of zinc are the only white pigments which he wants present in the mixed paint he buys.

But suppose that there were householders possessing this information; would they not then want to know, and would they not then be entitled to know whether

both carbonate of lead and oxide of zinc are contained in the mixed paint they buy and in what proportions they are combined? Moreover, inasmuch as the composition of the liquid portion of mixed paint is of equal importance with the white pigments, is not an intending purchaser entitled to know in all cases the relative proportions of pigment and vehicle and what the vehicle consists of?

But there is still another and, for the purpose of this law suit, more insuperable objection to the acceptance of the erroneous proposition as above stated. It is contrary to the record. It is directly in the teeth of an admitted allegation of the bill of complaint (Appellants' Brief, p. 15).

ERRONEOUS PROPOSITION No. 4.

Referring to the prejudice against labeled paints which an allegation of the bill (*admitted by demurrer*) asserts would be created, Judge Amidon's opinion suggests that it "could be overcome by trade experience" (Appellee's Brief, p. 58).

Elaborating upon this suggestion, counsel say (Appellee's Brief, p. 73):

> "In this strife of the new against the old the public is the final arbiter. It will inevitably decide in favor of the method or the article whose fitness for the required need is best demonstrated."

Again they say (Appellee's Brief, p. 74):

> "The final rank assigned to each pigment, statu-

> tory or substituted, will be determined by the consumer. He will judge of merits from the standpoint of actual use and by the strain of actual test. If the substituted pigments be indeed the more efficient, nothing can prevent the public from finding it out."

In the first place, both Judge Amidon and counsel *entirely ignore the other and at least equally prejudicial effect which consists in the expense of analyzing and labelling.*

But apart from this we would unhesitatingly subscribe to the above proposition, if the law required that *all* paints should be labeled. Neither class of paints would then benefit by the sanction nor suffer from the condemnation of the statute. The manufacturers of both classes of paints would be under the expense of educating the public as to the relative merits of the ingredients they use. There would then be a free fight and a fair chance for all. But as it is, the statute stamps its approval on unlabeled paints and stigmatizes labeled mixed paints as adulterated. Thus it has not only placed upon one class of manufacturers the financial burden of analyzing and labeling their mixed paints, but has saddled upon them, *and upon them alone*, the expense of carrying on a campaign of education whereby to overcome the prejudice and presumption created by the statute and to instruct the public in the merits and virtues of the ingredients discriminated against. In the race for recognition by the public, the mixed paints discriminated against have thus been paralyzed by having this dead load of expense and prejudice attached to them. This is the true situation of which appellee's counsel have the hardihood to

say (Appellee's Brief, p. 74) "that the field is open alike to both classes."

As to the ultimate outcome of this struggle for recognition of the value and greater efficiency of the ingredients branded by the statute as adulterants, there can be no question under the evidence.

Even Judge Amidon, in deciding the case against us has said (Appellee's Brief, p. 59):

> "I will not say that the weight of the evidence here shows that those elements are adulterants, not by any means. If I were sitting as a court to pass upon the question where the weight of evidence was controlling, *I should say at once that the weight of evidence in this case demonstrates that as to Class 'A' pigments the ingredients are very useful and in many cases indispensable elements in the manufacture of paints.*"

But the vice of the statute is that instead of allowing both classes of paint to compete upon equal terms, it has placed the burden spoken of only upon one class.

Judge Amidon further suggests that the extent and character of this prejudice would somewhat depend upon the manner in which the law is administered by the department of the state having charge of its administration. He finds in Professor Ladd's bulletin persuasive evidence that the law would be administered in a spirit of fairness. It would be easy to point out, were we willing to weary the court by detailed references to the statements in that bulletin, that it abounds with glaringly erroneous statements prejudicial to the ingre-

dients discriminated against. But how can the attitude of those who are for the time being in charge of the administration of the law make it constitutional, if by its plain terms it violates constitutional guarantees? Tomorrow Professor Ladd may be supplanted by another chemist more bigotted or misinformed than he. So long as this is a "government of laws and not of men," the law must be judged by its provisions and not by the liberality or illiberality of whoever may be from time to time in charge of its administration.

C. Reply to Counsel's Defense of the Exemption of Paste Paint.

From the fact that it appears from complainants' allegations in regard to their respective outputs in the State of North Dakota that only a portion of such output is represented by mixed paint, counsel jump to the conclusion that "the percentages of product of complainants, unaccounted for, probably represent their approximate output of paste paint."

Nothing in the evidence supports this assumption. The greater probability is that the percentages unaccounted for represent white lead or compounds intended for the same use.

But even if the percentages unaccounted for represented paste paint, it would then appear from the table in Appellee's Brief (p. 75) that the percentages of paste paint varied very widely in the cases of the different complainants. In the case of some, the output of paste paint would be only 25 per cent. In case of others it

would be 40 per cent. In the case of still others it would be 60 per cent. In one case it would be as much as 75 per cent. Each manufacturer's mixed paint competes with each other manufacturer's paste paint. Inasmuch as the law places its burdens only upon mixed paints, the result is that in case of some manufacturers the burden rests upon a very much larger portion of their business than in the case of others. In other words, the *burden of the law is not placed equally upon the different manufacturers.*

The suggestion (Appellee's Brief, p. 76) that, because oil must be added to paste paint to reduce it to the requisite consistency, it is "apparent painters and not the public at large would be the principal purchasers of such a product," is as unfounded as it is irrelevant. Painters, as is well known, buy white lead or compounds intended for the same use and mix with it colors and oils.

But even if painters, rather than the general public, were the principal purchasers of paste paint, would they not be entitled to the same protection as the householders who buy mixed paint? And how is it possible for the painter in buying paste paint to discover what it is composed of or to find out, before using it, what is its quality?

Entirely gratuitous is the assertion (Appellee's Brief, p. 76) that there is no proof of the adulteration of paste paints. It should be remembered that counsel use the term adulteration as meaning the use of ingredients not specified by the statute, and particularly the use of Class

"B" pigments. Mr. Joystad testified that T. L. Blood & Co. use zinc lead white in their paste paints. (Trans. 318, top). On their use of Class "B" pigments in paste paints he says:

> "Q. Did you ever try gypsum?
>
> A. Yes, sir.
>
> Q. What percentage of gypsum did you put into the mixed paint?
>
> A. Never tried it in mixed paint; I have tried it in paste form. (Trans., 324; Rec., 564–5).
>
> Q. Did you ever try the other Class B pigments than barytes for any other purpose and in any other combination than I have mentioned?
>
> A. Not in mixed paint. I have used them in other materials. (Trans., 325; Rec., 565).
>
> Q. Now, you do use barytes in paste paint, do you?
>
> A. Yes, sir.
>
> Q. In what kind of paste paint?
>
> A. Why, in different kinds of paste paint.
>
> Q. Different shades and for different purposes?
>
> A. Different purposes, certainly.
>
> Q. Do you use it also in light colored paints, paste paints?
>
> A. No, to very slight extent.
>
> Q. But in all your tints other than the very light ones?
>
> A. Yes." (Trans., 325; Rec., 566).

What is true in the case of T. L. Blood & Company whose mixed paints sold in North Dakota conform to its statutory standard, must certainly be assumed to be true of the paste paint of less orthodox manufacturers.

We do not claim that a law, in order to be constitutional, must aim at an existing evil wherever the same may be

found. What we claim as a condition of constitutionality is that a law which is intended to regulate an evil must not omit from the scope of its regulation persons or things which belong in the same natural class with those regulated, and where no fair reason exists for the regulation which does not apply to the exempted class. And the best criterion of which we know to determine whether persons or things belong to the same natural class is whether they are in competition with each other with reference to the subject matter regulated. Tested by this criterion the omission of paste paint from the provisions of the statute renders the same unconstitutional.

The suggestion of counsel (Appellee's Brief, p. 75) that "if the act covered both paste and mixed paints, and nothing else, a similar objection might with equal merit be urged against it because it did not include artists' tubes," misses the point that artists' tube colors do not come in competition with industrial paint.

The further suggestion (Appellee's Brief, p. 78) that "the State officers of North Dakota charged with the administration of the law interpret it as covering paste as well as mixed paint," and the reference in proof of that fact to a bulletin issued by the North Dakota Government Agricultural Experiment Station *four months after the filing of our bill*, are outside of the record and quite irrelevant. The law is to be interpreted by this court and not by the chief chemist of the Agricultural Station. As to whether under a proper interpretation of the law paste paint is exempted from its provisions, we have nothing

to add to what we said in our main brief (Appellants' Brief, pp. 7–8) except to suggest that appellee's interpretation would render the act obnoxious to the constitution of North Dakota, because the title is too restricted. Under a familiar canon of construction, however, a statute must, if possible, be so interpreted as not to make it appear unconstitutional.

D. Reply to the Argument that there is no Classification as Between Manufacturers.

Counsel contend (Appellee's Brief, pp. 82 *et seq.*), that because it is not made to appear that complainants, in the manufacture of mixed paint, confine themselves to the use of Class "A" and Class "B" pigments, they cannot complain of the classification of the statute.

The classification of the statute is not between mixed paints which contain none but statutory ingredients, and mixed paints which contain none but non-statutory ingredients. Its classification is between mixed paints which contain none but statutory ingredients and mixed paints in which some non-statutory ingredient is contained. The question therefore is: Are there some manufacturers who in the paints sold by them in North Dakota confine themselves to the statutory ingredients, whereas the complainants in the mixed paints which they sell in North Dakota use non-statutory ingredients? That such is the fact has been heretofore shown. (Prof. Ladd's Affidavit, Trans. 28, Rec. 48, 49, and Appellants' Brief, p. 198.)

Nothing is remoter from our minds than to claim that

complainants in the mixed paints sold by them in North Dakota confine themselves to non-statutory pigments. But mixed paints do not escape the requirement of labeling merely by containing the statutory pigments. They must be labeled, nevertheless, if, in addition to one or both of these, some non-statutory ingredient is used.

The alleged evidence upon which counsel base the conclusion that all of the complainants sell in North Dakota paints requiring no labeling in addition to paints which do require labeling, will not bear investigation. It consists of the following two items:

(*a*) While Professor Ladd was upon the stand, a catalogue purporting to be put forth by the complainant, *Devoe & Raynolds Company*, was shown to the witness, and the following so called testimony was given (Trans., 295–6, Rec., 517–8):

> "Q. Referring to page 50 of this catalogue, near the top of which is contained a picture of a can of paint, upon which appears the label, 'Devoe Lead and Zinc Paint, Ready for Use, Outside White 547. Manufactured by *F. W. Devoe & Co.*, New York. Chicago.' I will ask you if below the picture of this can there appears the following language: Devoe Lead and Zinc Paint. Ready for Use. Notice: These paints are strictly pure and sold subject to chemical analysis. Notice: These paints are put up strictly full measure. Notice: These paints are made only of pure white lead, pure white zinc, pure linseed oil, pure turpentine dryer, pure tinting colors.
>
> A. That is correct."

Whether this catalogue was published by the complainant, Devoe & Raynolds Company, does not appear. Whether it was published thirty, or twenty-five, or twenty, or ten, or five years ago, does not appear. The paint purporting to be described on page 50 of that catalogue appears to be a paint "manufactured by *F. W. Devoe & Co.*, New York–Chicago," and not by complainant, Devoe & Raynolds Company. Whether any sample of this kind of paint *was ever imported into or sold in North Dakota*, does not appear.

(*b*) A sample of mixed paint manufactured by the complainant, Patton Paint Company, analyzed by Professor Ladd (Trans. 61), did not contain any Class "A" pigment, but *it did contain two Class "B" pigments, making up more than 16 per cent. of the entire pigment.* This sample of mixed paint, under the statute of North Dakota, would have to be labeled.

Upon these two items of "evidence" counsel base the conclusion that *all* of the complainants sell in North Dakota paints which do not require labeling. Further comment seems unnecessary.

But even if it were an absolutely demonstrated fact that all of the complainants sell in North Dakota paints which do not require labeling as well as paints which require labeling, this would not deprive them of the right to complain of the classification of the statute, because it would still be true that to the extent to which they have established or seek a trade in North Dakota for paints which under the statute must be labeled, they are deprived of an opportunity of fair competition with

those manufacturers whose mixed paints sold in North Dakota conform to the statute. It would still be true that, as regards a most substantial part of the business of the complainants, burdens are cast upon them which are not cast upon others engaged in the same business and under, legally speaking, equal conditions.

Appellee's reasoning is best tested by the decision in Connolly v. Union Sewer Pipe Co., 184 U. S., 540, wherein the Illinois anti-trust statute was held unconstitutional because, while forbidding trusts and combinations generally, it exempted from its provisions agricultural products and live stock while in the hands of the producer or raiser. It is a matter of common knowledge that there are hundreds of merchants and manufacturers of all sorts of commodities who are also raisers of agricultural products or owners of stock farms or cattle ranches. Notwithstanding this fact, the statute was held to make a classification between agriculturalists and live stock raisers dealing with their own products, on the one hand, and manufacturers or merchants generally on the other hand. The fact that some paint manufacturers may make and sell in North Dakota both kinds of mixed paint cannot save the statute from the condemnation of the 14th Amendment any more than the fact that some persons belonged in one capacity to the class discriminated against and in another capacity to the exempted class, saved the Illinois statute from like condemnation.

The distinction which Judge Amidon draws between that Illinois statute and the North Dakota paint law appears to us untenable. He says (Appellee's Brief, p. 52):

> "The statute involved in that case defined a trust with great minuteness and made it a crime for any person, firm or corporation to do any of the acts embraced in that definition. It then excepted from the inhibitions of the act agricultural products and live stock while in the hands of the producers or raisers. It thus permitted producers and raisers of live stock to do the very acts which, if done by other members of society, were made criminal. The statute was tantamount to saying, 'It shall be a felony to steal horses in the State of Illinois, but this act shall not apply to farmers.'"

It is not true that the statute permitted producers of agricultural products and raisers of live stock to do the very acts which, if done by other members of society, were made criminal. It only permitted them to do these things with reference to agricultural products and live stock raised by them and while still in their hands. A producer of agricultural products or a raiser of live stock was not exempted from the provisions of the act if he took part, as might well have been the case, in some combination or trust for the raising of the price of tin cans, or of linseed oil, or of plows. In other words, a person was not exempted from the provisions of the statute simply because he was a farmer, but only if, in addition to his being a farmer, the subject matter of a trust or combination into which he had entered were agricultural products or live stock, produced or raised by himself and while they were in his own hands.

The statute was not tantamount to saying what Judge Amidon says it was. The statute merely said this:

"It shall be a felony for all persons, *including farmers*, to enter into combinations to raise the price of commodities of any kind, but this act shall not apply to farmers so long as they combine with reference to agricultural products or live stock which is raised by them and while it is in their hands." In this form there is a clear analogy to the case at bar where the statute says: "It shall not be permissible in this State to sell mixed paint unless the same is labeled. But this act shall not apply to persons so long as they sell mixed paint wherein there are employed none but six specified ingredients."

If the selling of mixed paints without labels is an evil because of the opportunity it affords to sell poor mixed paints under cover of a sealed can, then why should the class exempted by the statute be excused from the requirements of labeling when it is clear that the opportunity for practicing the evil aimed at is the same in all classes of mixed paint?

To say that the classification of the Illinois Anti-Trust statute is merely arbitrary and capricious, and that the classification in the North Dakota paint statute is not wholly arbitrary and capricious, is begging the question. To us it appears that there are a thousand times better reasons for placing farmers while dealing with agricultural products or live stock produced or raised and possessed by them in a separate class, with reference to the legislative object of preventing trusts and combinations, than there are for the classification in the case at bar.

Nor are we able to appreciate the reasoning which leads Judge Amidon to say (Appellee's Brief, p. 57):

> "In the first place, it is proper to consider in respect of what the classification is made. It is not classification in respect to crimes, saying that one class of acts shall be criminal and another class of acts shall be innocent. It is not a classification which says that one order or one class of a community, if it commits a certain act, shall be guilty of crime and the other, if it does the same act, shall be innocent. Neither is it a classification which, upon the one hand, prohibits the sale of one class of articles and, upon the other hand, permits the sale of another class of articles."

The classification in this case is just exactly what Judge Amidon says it is not. It is a classification in respect to crimes. The statute says that one class of acts (selling unlabeled mixed paints of the discriminated class) shall be criminal, and another class of acts (selling unlabeled mixed paints of the exempted class) shall be innocent. The statute upon the one hand prohibits the sale of one class of articles (unlabeled mixed paints belonging to the class discriminated against) and, upon the other hand, permits the sale of another class of articles (unlabeled mixed paints of the exempted class), although there is no difference between the two arbitrarily created classes with reference to the only imaginable legitimate purpose of the act.

We agree with the statement of counsel (Appellee's Brief, p. 79) "that the police power will be upheld for the prevention of fraud or deception upon the public, and to promote fair dealings," but it is nevertheless true that the exercise of the police power is subject to the condition that it do not violate the guaranties of the Federal

Constitution. If this power is exercised so as to put an unreasonable or unjust restraint upon the constitutional right of liberty or property, the legislation is invalid.

E. Reply to Counsel's Comments upon Authorities.

In stating that the decision in the case of *People vs. Hawkins*, 157 N. Y., 1, proceeded upon no other ground than that the statute there involved was in conflict with the commerce clause of the Federal Constitution (Appellee's Brief, p. 88), counsel were led into error by the misleading syllabus in the report of that case. The decision is distinctly based upon the ground that the New York statute which required all prison made goods to be labeled "convict made," was invalid because the value of articles thus labeled would be seriously impaired and because "the citizen cannot be deprived of his property without due process of law." Merely *arguendo*, by way of a reply to a suggestion made by some members of the court that the statute could be upheld under an amendment to the New York State constitution with respect to prison labor, the majority opinion holds that if the State constitution were capable of a construction under which goods made in an Ohio prison could not be sold in New York, the statute would then appear to be in conflict with the commerce clause of the Federal Constitution.

We fail to discover any analogy between the case of *Patapsco Guano Co. vs. N. C.*, 171 U. S., 345 (cited in Appellee's Brief, p. 80) and the case at bar. In that case the court considered a statute which required that *every* package of fertilizing materials must bear a label or

stamp showing "the chemical composition of the contents of such package and the real percentage of any of the following ingredients asserted to be present, to-wit: Soluble and precipitated phosphoric acid, which shall not be less than 8 per cent., soluble potassa, which shall not be less than 1 per cent., ammonia, which shall not be less than 2 per cent. or its equivalent in nitrogen." The statute further provided for an inspection charge of twenty-five cents per ton on such fertilizers.

It should be noted that the label referred to was required upon *every* package of fertilizer, no matter how composed; that in requiring that 11 per cent. of the contents should be composed of certain prescribed ingredients, the statute simply aimed against the sale as commercial fertilizers of articles which should be devoid of ingredients without which they simply would not be commercial fertilizers (See p. 358 of the opinion). Nor does it appear that the constitutionality of the statute was questioned upon the ground of its requiring such a label. It was attacked merely on account of its provision for the inspection charge. The law was not attacked upon the ground that it made an arbitrary classification of fertilizers, but merely upon the ground that it violated the third clause of Section 8 and the second clause of Section 10 of Article 1 of the Constitution.

The case of People *vs.* Webster, 17 N. Y. Misc., 410, which declared constitutional a penal statute limiting the use of the word "sterling" to compounds having .925 per cent. of pure silver, has no application to the case at bar. This statute merely recognized the fact that from time immemorial the term "sterling" as ap-

plied to silver and as understood by the general public meant silver of a certain degree of fineness, and it simply prohibited persons from stamping as "sterling" silver that which was not "sterling" silver.

Similarly, statutes which prohibit the sale as "lard" of any article "which contains any ingredient but the pure fat of healthy swine" unless labeled "compound lard" with the name and proportion of the ingredients, are without any analogy to the statute under consideration in this case. Upon consulting the Century Dictionary we find "lard" to be defined as "the fat of swine after being separated from the flesh and membranes by the process of rendering; the clarified semi-solid oil of hog's fat." Lard is an article of definite composition. If anything else is mixed with it, it is not entitled to be called lard, but can truthfully be described only as lard in connection with something else. To require that this something else be defined upon a label is clearly a regulation in the interest of health, inasmuch as lard is an article of food, and in the interest of preventing deception, inasmuch as an article which is partly lard and *e. g.* partly tallow is no more entitled to be called "lard" than a compound which is half copper and half zinc is entitled to be called copper. That paint, on the other hand, is not an article of definite or certain composition has been heretofore shown(Appellants' Brief, p. 188, *et seq*).

Respectfully submitted,

SIGMUND ZEISLER and
HENRY L. STERN,
Attorneys for Appellants.

Supreme Court of the United States,

October Term, 1907, No. 41.

HEATH & MILLIGAN MANUFACTURING COMPANY, THE SHERWIN-WILLIAMS COMPANY, et al.,

Appellants.

vs.

J. H. WORST, DIRECTOR OF THE NORTH DAKOTA GOVERNMENT AGRICULTURAL EXPERIMENT STATION.

APPELLEE'S BRIEF.

STATEMENT OF FACTS.

The bill charges that the complainants are denied the equal protection of the laws guaranteed by the 14th Amendment in that the statute of North Dakota requires manufacturers of mixed

paints to lable the ingredients composing them, unless such ingredients are those specified in the statute, namely: Carbonate of Lead, Oxide of Zinc, turpentine, Japan dryer and pure colors. It is claimed certain other materials possess value as pigments in the preparation of mixed paints equal to or greater than those of carbonate of lead and oxide of zinc. The gravamen of the bill is found in sub-paragraphs "A" and "B" of paragraph 17 as follows:

"(a) That there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection therewith and in other cases may be used instead thereof, and which, either without carbonate of lead or oxide of zinc, or in conection with one or both of these, according to circumstances, are as efficient as, and in some respects more efficient than, carbonate of lead or oxide of zinc or a combination of the two for the purposes for which the latter are used in paint; that among said materials are (a) sublimed lead (which is an artificial product consisting of sulphate of lead and oxy-sulphate of lead), (b) standard zinc lead white (which is commonly called zinc lead and is an artificial product made by the United States Smelting Company and sold in large quantities and consists of a combination of sulphate of lead and oxide of zinc united by a furnace process), (c) zinc made from western ores which carries in its natural composition varying proportions of sulphate of lead and oxide of zinc, and (d) an artificial opaque white pigment, consisting essentially of zinc sulphide, zinc oxide and barium sulphate which is known to the paint manufacturing trade under various trade names such as lithopone, ponolith, lithophone, charlton white, becton white and Orr's white.

"(b) That there are certain white pigments other than carbonate [illegible] oxide of zinc which [illegible] proper and useful ingredients of paints and which, if so used in connection with

carbonate of lead or oxide of zinc or a combination of the same, or in connection with one or more of said other materials described in the last preceding paragraph as proper substitutes for carbonate of lead and oxide of zinc, furnish to the paint wherein used important useful qualities not possessed by either carbonate of lead or oxide of zinc or any of said substitutes therefor; that among said other pigments are sulphate of barium, silica, silicate of megnesia, calcium carbonate, hydrated sulphate of lime, and others; that the proportionate amount of the pigments last named which may properly and usefully be made an ingredient of paint and whether any of them may be properly used as such ingredient depends upon a great variety of conditions and circumstances, but all of said pigments may, under proper conditions, serve a highly useful purpose and where properly used do essentially increase the durability and density of the paint." (20-22). The trial court directed a reference and testimony was taken upon these allegations of the bill. Subsequently, by stipulation, the case was submitted upon the bill, the answer to paragraph 17, the demurrer to the other allegations of the bill, the affidavit of Professor Ladd and the evidence taken upon the reference.

The right of the legislature to classify pigments used in the manufacture of mixed paints, requiring certain ones if used to be labelled so as to show what they are, and permitting others to be employed unlabeled, is the one point involved upon this appeal.

Is the legislation in question capricious, arbitrary and unreasonable; or does it involve the legitimate exercise of legislative discretion and judgment?

Are the values of the so-called substituted pigments established so fully that they are no longer in the region of debate? Are their merits so conclusively proved as to render nugatory and void the legislation of the state of North Dakota

which seeks to place them in a class separate and apart from carbonate of lead and oxide of zinc?

We think the record, far from supporting the averments of sub-paragraphs "A" and "B" of the bill, clearly proves that the valuable qualities of the substituted pigments for use in the preparation of mixed paints are neither established as a matter of chemical theory nor conceded by the manufacturers themselves.

We review at some length certain salient features of the record bearing upon these propositions.

It is not denied there were great evils present in the sale of mixed paints and which were sought to be corrected by the legislation in question. An analysis of the paints appearing upon the market such as "White Lead" showed the actual percentage of that pigment to range as low as 3.34 per cent. while barytes appeared in varying proportions, in some as high as 99.28 per cent. (90.) According to trade literature some packages labelled "Pure White Lead" did not contain a trace of that pigment (80).

Complainants' witness, Frank A. Lane, characterized one of these samples as a fraud upon the public. (231).

Complainants Sherwin-Williams Co. placed upon the market a mixed paint for outside use containing in the fluid portion 4.4 per cent of water (91); in others water was found present up to 22 per cent (98, 103).

Complainants Heath & Milligan, in a trade advertisement, say, "Not a drop of anything but pure linseed oil and turpentine should be added to best prepared paint," (78).

Complainant Patton condemns the use of water (79). Complainants' witnesses frankly admitted the evils of adulteration in the preparation of mixed paints (122, 317).

The class "a" pigments are four in number, (1) sublimed white lead, (2) zinc lead white, (3) zinc from western ores, (4) lithophone. The evi-

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dence shows that the first, second and fourth of these pigments are so-called artificial substances of more or less recent production; the third, zinc from western ores, is not found or used in the eastern part of the U. S. (196). Dr. Charles Benjamin Dudley, chief chemist of the Pennsylvania Railroad Co. was one of the three witnesses for complainant. He testified his company consumed and used annually about $1,000,000.00 worth of paint material, including oils, japans, varnishes, surfacers and paints more directly or positively so called (112); one-third to one-fourth of this sum is expended for mixed paints (132).

In reply to a question he said:

A. Our studies on white pigments have led us to the general conclusion in brief that both white lead and zinc white are distinctly inferior pigments. The unfortunate phase of the case has been that we did not know *until recently* of any better and were therefore compelled to use them. In detail, white lead is an easily decomposable body, not stable. Mixed with linseed oil, apparently chemical reaction takes place which results in a rapid perishing of the paint, well known as powdering or flouring. Also the pigment is readily acted upon by the gases arising from the burning of coal or in the air from sewers, and is discolored thereby. Also in our studies, from some cause, probably the presence of finely uncorroded metallic lead, a surface painted with white lead becomes yellowish. These statements should be taken as apparently based on observations; for the absolute chemistry of the changes that give the results I do not think has been worked out yet. The results are patent. Zinc white——

Q. When you speak of zinc white do you refer to oxide of zinc?

A. Yes sir.

Q. And when you refer to white lead do you refer to commercial carbonate of lead?

A. Yes sir, the statutory carbonate of lead is described. Zinc white apparently combines like-

wise with linseed oil when applied as a paint, forming a layer which has a great tendency to crack and peel off and also does not stand well outside exposure. That covers the most that I care to say.

Q. Describe the evolutionary process by which you reached the conclusion, if you have,—that some other pigment is better than the statutory pigments or that the defects of the statutory pigments which you have described can be remedied by the addition of some other pigment?

A. Paint, as we understand it, is a mixture of finely divided matter with, for the purposes, linseed oil. I exclude all other substances that may be used for the moment to give you some idea. If the finely divided matter is of such a nature that it can, by chemical change, combine with the linseed oil, usually in our experience a product is formed that is not as durable and valuable as though the finely divided matter which we commonly call pigment was absolutely inert to linseed oil. Now, the first basis for a complaint against the statutory pigments is that they easily result in such chemical reaction with constituents of the oil. The same principle, namely, inertness to chemical change, has led us to look for any other pigments that might be found in the realm of nature that were inert upon linseed oil to take the place of the statutory pigments. And as I said at the outset, the statutory pigments, in accordance with our studies are inherently defective and bad.

Q. How did you overcome the inherent defects of the statutory pigments, or what conclusion have you arrived at as to the manner in which those defects can be overcome or partly overcome?

A. I know of no method by which the defects of the statutory pigments may be absolutely overcome. Their defects may be diminished or minimized in two or three ways; first, abandoning them entirely and using others; second, mix-

ing with the statutory pigments other pigments which do not have the defects mentioned and thus obtain a paint layer which will be less subject to the defects that have been already stated. * * * * * * * * * (115-116).

Q. What is the quality possessed by these class "B" pigments which you have mentioned which gives them the value that you have spoken of?

A. Largely, it seems to me, inertness to chemical change, they being permanent chemical bodies which do not readily lend themselves to combinations with any of the constituents of the oil. (119). * * * * * * * * *

Q. And which class do you prefer, those which contain a third pigment or those which do not contain a pigment of class "B"?

A. Provided the material is sold on its merit we prefer the paints containing a pigment of class "B". I might explain that if a dealer should agree to sell us at a price a material containing only the statutory pigments and it should be found that it contained Class "B" pigments, we would regard that as a fraud and object to it. On the other hand if we get a material at a proper price such as we would prefer, it would be a mixture of the statutory pigments, if they are the ones involved, with a third pigment of class "B". (122).

The witness assented to the qualities of sublimed white lead given by Professor Ladd in his bulletin (126) and in addition said he thought the life of the paint in which it was used would be greater than one in which carbonate of lead was employed. In an analysis made of paints used by his company, sublimed lead had been found and to witness' knowledge no complaint had been made against it (127). Upon cross-examination Dr. Dudley, among other things, testified:

Q. Do you consider that the presence of sublimed lead mixed with the statutory pigments is desirable when the building covered or where

the surface covered with paint is exposed to gas such as comes from the consumption of coal?

A. I would expect less decomposing action from this gas if sublimed lead was present. (137).

* * * * * * * * * * *

Q. Well, in the specifications as far as you have prepared them, have you universally required the use of some percentage of sublimed lead?

A. We have not.

Q. Have you in any case required it?

A. We have not.

Q. Then if we judge of the value and desirability for useful purposes of sublimed lead in admixture with other pigments in the preparation of paint by the use or non-use of the same by your railroad company, we would conclude that it is not a very desirable ingredient, would we?

A. I do not think you would be entitled to that, as we have not yet prepared any specifications involving the use of statutory pigments either. The question is under investigation. I think that I have already stated that we have not reached a final conclusion yet.

Q. Then is sublimed lead a pigment of such comparatively new and recent use in the evolutionary process of the manufacture of paint that the Pennsylvania Railway Company, with the great chemical department controlling that part of its business, has not yet found it advisable or desirable to specify it as an ingredient?

A. That would hardly be the correct statement of the case. The reason why the specifications involving either statutory pigments or sublimed white lead have not yet appeared is simply the pressure of other work, more important work, especially where safety is involved, and the chemical department is more than loaded with work at the present time, and the effort has not yet sufficed to reach this feature. In our work on chemicals we intend later on to cover this ground, but were switched off by the direction of higher

authority to the study of such subjects as involved the safety of life and property. The reason why it has not yet received more consideration is not because of the newness or because we do not consider it a good material or an important subject, but other things more important have taken precedence.

Q. You must at least say, I should think, doctor, that your investigations of sublimed white lead have not led you to class it—to put it on an equal plane with the statutory pigments?

A. Well, do you mean by that that I have not put it upon the same plane with the statutory pigments mentally or as relating to output or work done.

Q. For the purpose for which paint is considered desirable and useful, both—body, durability and opaqueness, pleasing appearance to the eye—all the purposes for which paint is desirable?

A. Well, if you mean that I do not consider sublimed white lead having those valuable properties, I should say no, for I do consider it as having those valuable properties. If you mean that this knowledge and opinion on my part has not yet reached a public expression in the form of a specification, I say yes, for it has not yet reached that.

Q. Sublimed white lead has been upon the market as a commercial product for about how long?

A. I think some of the other gentlemen can tell you better than I, but I would say from memory ten years or more.

Q. Well is it not a fact that it is only about five years since it has been in use?

A. I think the increase in its use has been within the last five years, the great increase.

Q. Can you tell us what percentage it constitutes of all material or agents used as pigments?

A. No sir, I could not give you any answer.

Q. You could not tell me?

A. I have no judgment.

Q. You do not know that it does not constitute as much as five per cent.?

A. No, I do not know that it constitutes twenty. I could not give you any estimate that would be of any value.

Q. Well, is it not true, doctor, that among expert chemists engaged in the study of the manufacture of paint the desirability and value of sublimed lead is a matter of great debate and doubt at this time?

A. In my experience with the manufacturers, and many of them come to Altoona for interviews, I find a *growing, a rapidly growing belief* that sublimed white lead is a valuable pigment.

Q. Well, just answer the question.

A. I do not know whether I have given that. I will give you anything—

Q. Just answer if it is not a matter that is open to serious debate and is not the value of it questioned by many of these experiments?

A. I do not think I can say that, sir. The experience which I have had indicated exactly what I said, that the objections first raised against the material when it first appeared *are rapidly disappearing* and the bulk of the trade as I meet it is indicating that it is a valuable material and going into use. To illustrate, if you choose, we recently put out an experimental specification, based upon white lead and leather black or pigment. We required that each manufacturer should send a sample gallon that would be regarded as standard with which shipments might be compared later, this being an experimental specification. One of the dealers wrote me a personal letter and asked if he *might substitute sublimed lead* for *white lead*, and I answered we would be glad to see a sample gallon but *afraid whether it would dry properly*. He sent the sample gallon and it proved satisfactory in every sense, so far as the uses went, so far as drying.

Q. Is it not true that a considerable number of old and well established paint manufacturers in the preparation of the mixed paints excluded the sublimed lead altogether as a pigment?

A. You would have to ask somebody else that, for I don't know. I am not well enough informed.

Q. Is the composition of sublimed white lead uniform?

A. I don't think I could say that of my own knowledge. *Our examinations have hardly gone so far as to entitle us to a positive statement.* (137-141).

* * * * * * * * * * *

Q. In your testimony in chief the only one of the substitute pigments of Class "A" to which you have alluded is the sublimed lead, is it not?

A. Yes sir.

Q. You have not been interrogated in regard to nor testified concerning standard zinc lead white commonly called zinc lead, zinc made from western ores nor the artificial pigment known as lithopone?

A. No sir.

Q. You have testified in regard to none of those?

A. No sir, not yet.

Q. You have not found it advisable in the conduct of the business of your department to employ any of those pigments in the preparation of your paints?

A. We made some study some years ago.

Q. I just asked you if you employed them?

A. We have not.

Q. And spending, as you company does, a million dollars a year approximately in the purchase of paints?

A. Paint materials.

Q. Paints and painting materials?

A. Yes sir.

Q. The only one of the substitute pigments

mentioned in class "A" which your company has used is sublimed lead?

A. I am hardly able to say that, because we do not examine all the paints, as I have already stated, and do not know whether zinc lead or zinc from western ores and sometimes lithopone may not be present. I can not say that it is not.

Q. There are none of those three standards of a character which has heretofore led you to specify or require the use of any of them in paints purchased for the Pennsylvania R. R. Co.?

A. They have not.

Q. And you would say, generally speaking, that they are so new in point of use and are of such untried and undemonstrated value as pigments in the preparation of paint that you do not consider it wise or safe to specify them?

A. I would hardly say that.

Q. But as a matter of fact you do not?

A. We have not for reasons already given.

Q. And if they are used in any of the paints that your company uses, it has been without your knowledge?

A. Thus far, yes sir. (153, 154).

Upon re-direct, the witness testified he had made no examinations of zinc lead white nor of zinc made of western ores.

Q. You have not made any examination of lithopone I understand?

A. Not recently. When the material first appeared we examined it, and in those early days it seemed to be quite the thing we had been hunting for, something that was free from the objections to white lead and zinc white, *but the material passed out of prominence* for some reason which I am not familiar with, *and it has never come forward into our realm prominently since.*

Q. Do you use enamel paints in the various uses for which paints are used by your railroad?

A. We do.

Q. Do you know whether those enamel

paints which you purchase do contain lithopone or not?

A. I am unable to say positively. I do not have in mind any recent analysis that indicated the presence of it. (160).

Upon re-cross examination the witness testified as follows:

Q. You said that lithopone came into some prominence a number of years ago and then disappeared, did you not?

A. Yes sir.

Q. And you have not made tests or analysis or satisfied yourself as to its value as a pigment, have you?

A. Our first studies as I said, *led us to be very hopeful in regard to it* that it was going to be the most valuable white pigment that we knew of.

Q. Such hopefulness is a different proposition from being entirely satisfied as to its value, is it not?

A. Yes sir.

Q. And you put it in that very qualified way?

A. I think that I might go a bit further, namely, that experiments with it seem to indicate that it ha[illegible]overing power and body and working qualities and chemical inertness, all of which we were hunting for and which are not so characteristic in many of the cases, at least not of the statutory pigments. (169).

Q. Of course, doctor, it is true, is it not, that the statutory pigments command a higher price upon the market than the great bulk of substitutes mentioned in "A" and "B." That is true, is it not?

A. So far as my knowledge goes, yes sir.

Q. And yet it is your opinion that some of these substitutes when mixed with the statutory pigments produce better results?

A. Yes sir.

Q. Now, you mean by that, I suppose, bet-

ter results in view of the price at which it costs?

A. No sir, I think they make a better paint.

Q. Make a better paint?

A. Yes sir.

Q. Then it remains true nevertheless that while these pigments mentioned in "A" and "B" produce in combination a better result, yet on the market they are cheaper than the statutory pigments, are they?

A. I think that is right.

Q. So then you would not conclude, because the statutory pigments maintain the world over a higher range of prices upon the market as commercial products, that they are more valuable for the purpose for which they are necessarily used in the manufacture of paint than some of these pigments mentioned in "A" and "B"?

A. No, I would not.

Q. You would not?

A. No sir.

Q. Then you would to that extent disagree with the general conclusion of the mercantile and the business world, the most of the people who use paints, in their estimate of the comparative values of these pigments, would you?

A. Well, I do not know as I would quite say that. In the first place I am not quite familiar with that being the general conclusion of the world as to the value of these ingredients at the present time.

Q. But you say that you do understand the statutory pigments command the higher price?

A. Yes, but that may be due to cost of manufacture.

Q. But if the substitutes mentioned in "A" and "B" serve the purpose of the statutory pigments, what good reason can you give for their not commanding the same price commercially?

A. *The reason being, because they cost less to manufacture, in the first place; and, second, because any established industry, in my judgment, holds the ground it has obtained for a*

period of time, notwithstanding the tendency towards the abandonment of the use of any expensive material when a cheaper substitute is found that does the work. Hundreds of illustrations could be given of that. (171, 172).

Maximilian Toch, a paint manufacturer of New York and a chemist, testified for complainants:

He preferred sublimed white lead to the carbonate because the former is inert to linseed oil while the latter is not; he considered the paint made from sublimed white lead and zinc oxide to be superior to one made of a combination of carbonate of lead and oxide of zinc, (186, 187); he stated that zinc made from western ores was not used in the east for the reason it is too expensive, that it costs more than the zinc mined in New Jersey (196). He considered zinc lead white as a valuable pigment and in proportion or in ratio to the lead it contains is as good as sublimed white lead (195). He discussed at length the uses of lithopone. Upon cross-examination he testified as follows:

Q. Carbonate of lead, is however, the oldest of all pigments, is it not?

A. Yes sir.

Q. And has been in use since the beginning of the Christian era or before that time?

A. The Romans used mineral native carbonate of lead.

Q. And, as you have already said, it has, through all the centuries which have come and gone since that time, been in use and down to the present time is the most generally used pigment, is it not?

A. That, I believe, is correct.

Q. And it also is the highest priced, of course, of any of these pigments?

A. That is true, too.

Q. Possesses the greatest commercial value?

A. It does.

Q. And it has more general recognition, I suppose, the world over, than any other pigment, has it not?

A. I think excepting France and Germany.

Q. And in France and Germany that is not true? It is true except in those two countries?

A. In France, I believe, it is illegal to use lead, for government work anyway.

Q. Because of its poisonous qualities?

A. Because of its noxious qualities.

Q. Now, while you have expressed the opinion Mr. Toch, that a better and more valuable paint can be made from the pigments in classes "A" and "B" than from the statutory pigments, you would not claim that that is an opinion which is universally or even generally held among paint manufacturers, would you?

A. I would, *among those paint manufacturers who know their business,* I would expect that.

Q. Are there not a large number of paint manufacturers who contend that the statutory pigments are the only proper ones, the only satisfactory ones to be used in the manufacture of paint?

A. There may be some who contend that.

Q. Are there not large manufacturers of paints at this time who do not use any of these substitutes described in "A" and "B", but who practically or substantially make their paints out of the statutory pigments?

A. Not a majority that I know of.

Q. I didn't ask about the majority; I asked you if there were not a considerable number.

A. I wouldn't say even a considerable number, because there are only perhaps one hundred recognized or large paint manufacturers, mixed paint manufacturers, in the United States; I don't think there are any more; and out of that one hundred I am quite sure that not the majority uses statutory pigments.

Q. Do you classify the output of your fac-

tory as one of the one hundred leading manufacturers of the United States?

A. I would not, no.

Q. Then your factory does not fall in that class?

A. I don't think we are large enough.

Q. How great a production must a factory have in order to be included in this class of one hundred to which you allude?

A. Oh, I think at least 100,000 gallons per year of mixed paint.

Q. Now, you say you do not believe a majority of these 100 of the leading or largest manufacturers of paint use only the statutory pigments in the manufacture of mixed paints; is that what I understood you to say?

A. That is correct.

Q. Well, then, in your opinion would the number be about equally divided, would there be about one-half of that one hundred who would use only the statutory pigments and the other half using either the statutory pigments or those mentioned in "A" and "B" in composition therewith?

A. Not having tabulated it, I would prefer not to give an exact answer. I really do not know the number.

Q. Well, as nearly as you are able to tell us, will you tell us?

A. As nearly as I am able to tell you, it is simply that I meet the paint manufacturers and am frequently asked and know their formulas. know the formulas of many of them and I understand that today this man would use zinc lead, another man would use sublimed lead, a third man would use zinc oxide and barytes, and a fourth man would use the statutory pigments plus barytes or plus magnesium silicate, and so on, so that I have never yet found any two to make identically the same thing.

Q. The manufacturer who confines himself to the statutory pigments—they being, as I un-

derstand you about fifty per cent. of these one hundred large manufacturers—would contend just as strongly that the statutory pigments were the only proper ones as you would contend that it is permissible to use these others without destroying or impairing the usefulness of the paint?

A. I suppose they would say that.

Q. *There would be this well-defined cleavage of opinion, and it does exist to-day between the manufacturers, does it not, on that subject?*

A. *It does.*

Q. *And it is not a settled question at all so far as the manufacturers are concerned as to the usefulness or efficiency as substitutes of these pigments mentioned in "A" and "B" over the statutory pigments?*

A. *That is very true. On the other hand, fifteen or twenty years ago there were a greater number who believed in the statutory pigments and, as we go along, we learn and progress. There are some paint manufacturers who probably are not as progressive as others and they have not altered their methods.*

Q. And out of this kind you think that about fifty per cent. of this total of one hundred large manufacturers are convinced that it is proper and all right to use as substitutes the pigments mentioned in "A" and "B"?

A. Oh, the question of fifty per cent. is merely a guess.

Q. However, it is your best guess?

A. It is my opinion that probably that may be it more or less. (219-222).

* * * * * * * * * *

Q. You say that oxide of zinc has been in general use as a pigment in the manufacture or preparation of paint for about thirty years?

A. For longer than that.

Q. Longer than thirty years?

A. Yes sir.

Q. And its value as a pigment became well

established and universally recognized about thirty years ago?

A. That, of course, I am only speaking from hearsay; it wouldn't amount to anything.

Q. Well, you are an educated man in chemistry, and on the subject of paints; you have studied and read up on this subject all your life?

A. I have.

Q. Well, employing your best knowledge as an expert, as you have presented yourself to us here to-day, tell us how long it is since oxide of zinc has received general recognition as a valuable pigment in the manufacture of paint.

A. About thirty years.

Q. Now, prior to that time it was in a condition where people didn't know what the ultimate outcome would be as to its value, was it?

A. No.

Q. Did it undergo a period of uncertainty as to its value?

A. No; it underwent a period of uncertainty as to its composition and color.

Q. Did it take a number of years to test its durability, its staying qualities, its value, its life?

A. That had been previously done in France.

Q. Well, you can't tell about the durability or life of any of these new materials until they have been used for a series of years?

A. That is true.

Q. You have already stated, in answer to Mr. Zeisler's question, that it requires time and use under varying conditions, to demonstrate the value of any of these new materials?

A. Yes sir.

Q. It took time to demonstrate the value of oxide of zinc, didn't it?

A. It did.

Q. Before it was generally recognized?

A. Yes.

Q. *And it likewise will require time to demonstrate to the general satisfaction, or to the sat-*

isfaction of the trade generally, the value of many of these new articles which are contained in "A" and "B", will it not?

A. *It will.*

Q. Now, some of these ores produced from the western mines you don't know anything about yet, do you? You said you have not used them down east?

A. Oh, I have used them in an investigating way, and I feel I know something as to their merits.

Q. But a good many of them are so new in the world of commerce that their values are not generally recognized or known yet, are they?

A. Not a good many. I don't classify the paint materials in class "A" as being new.

Q. Well, you would a good many of those in class "B" wouldn't you?

A. Class "B" are almost all older than class "A".

Q. Well, you take sublimed lead and you say that as it is produced now, it is very much better and more even than it was originally produced; is that what you say?

A. Yes sir.

Q. And I understood you to say, in answer to a question of Mr. Zeisler, that its qualities and usefulness for the purpose of paint had been very greatly increased for the past five years.

A. Yes sir.

Q. Was that true?

A. That was true.

Q. And it is in an evolutionary process of development, is it, from a material of ordinary value to one of greater value?

A. Yes sir.

Q. That is what you mean, is it?

A. That is exactly what I mean.

Q. And this process, in your opinion, is increasing its value from time to time or year to year?

A. Naturally.

Q. The state of the art is such that new things are learned and applied in its manufacture to its improvement.

A. There is, sir, yes sir. (241-243).

* * * * * * * * * * *

Q. *Did I understand you to say that it was problematical if lithophone adds to the value of paints?*

A. *I meant it was a problem which I had not worked out.* I knew about its value in the arts for manufacturing certain materials, knew about its value as an enamel, a pigment in an enamel, but I did not know, I had not sufficiently worked out its value as compared with some of the materials in class "A". (225).

* * * * * * * * * * *

Q. State whether or not, within the last five years, the manufacture of sublimed white lead has made rapid strides and material progress?

A. The history of all chemical industries is virtually the same. No man ever succeeds at the very outset with his material, and even though he is fairly successful in turning out a material, he is continually able to improve it. And such also is the history of the zinc oxide material in this country.

Q. How about sublimed white lead?

A. Referring to sublimed white lead, improvements are continually being made, the same as have been made in almost all chemical industries?

Q. State whether or not you have made analysis of a sufficient number of samples of sublimed white lead within the last five years to enable you to state definitely regarding the variability of the composition of sublimed white lead.

A. I personally haven't made any in five years. At our laboratory, I believe we made two or three and found them to be if my memory serves me rightly—we had three packages to draw from and found them all three identical.

Q. Were they examined about the same time or at different times?

A. Examined all at the same time.

Q. But they were from different lots?

A. That I don't know.

Mr. Watson: I move to strike out the testimony as to the invariable character of sublimed white lead testified by the witness and just referred to, for the reason that it does not appear but what they all came from the same lot of material, and that such evidence does not tend to show any uniformity or lack of variance. (238).

Upon rebuttal Professor Toch testified:

Q. Well, would you tell us about how much carbonate of lead you use in your factory a year, measured by carloads?

A. I should say between three and five.

Q. And, measured in the same way, how much sublimed white lead do you use in your factory per annum?

A. We use very little sublimed white lead.

Q. Well, half a carload or five barrels or how much?

A. *Well, practically none; I am just beginning again to use it. I use, instead of sublimed white lead, zinc lead; I use that in large quantities.*

Q. How long ago did you discard the use of sublimed white lead in your factory?

A. I have practically never discarded it; I have always had it.

Q. Well, you say you have just recently taken up its use.

A. Taken it up in a larger sense.

Q. Well, how largely did you ever use sublimed white lead in your factory, measured by barrels or carloads, per annum?

A. Oh, when we bought it in large quantities, I believe we used to buy a carload at a time; I am not sure about that.

Q. Tell me per annum how much you ever used of it?

A. I couldn't tell you without looking it up.

Q. You never used more than a carload or two of it a year at any time, did you?

A. I believe that is correct.

Q. How many years ago was it that you partially discarded it and substituted zinc lead white?

A. Seven years ago.

Q. How did you happen to discard it seven years ago in favor of zinc lead white?

A. The price of zinc lead white was considerably lower than that of sublimed lead; the ratio of sulphate to oxide was such that I found, by making a manipulation of the addition of other lead compounds I could attain similar results, results which were satisfactory for a certain class of paints.

Q. Then, notwithstanding the valuable qualities and the virtues of sublimed white lead, you did pretty largely exclude it from use and substitute the zinc lead white because you found it was more profitable than to use the lead?

A. No sir, not at all.

Q. Well, you just said you could get the same results at a less cost?

A. But—

Q. Well, you have just said that, haven't you? That is true?

A. I got a paint which answered the same purpose, I said.

Q. And you got it at less cost, didn't you?

A. Not particularly at a less cost; probably an easier method for me.

Q. Then I was wrong in gathering from your evidence, what you have testified here a few moments ago, that the matter of a difference in cost between the zinc lead white and the sublimed white lead had something to do with your excluding the latter from your factory, was I?

A. Yes sir.

Q. What you said didn't justify that inference upon my part?

A. No sir, it did not.

Q. Why did you go back again, then to the use of sublimed white lead more lately in your factory?

A. Sublimed white lead is very much whiter than zinc lead.

Q. Is that why you came back to its use?

A. No sir, not entirely.

Q. I asked you to state why, after having practically excluded it from use in your factory, in favor of zinc lead white, you have more lately returned to and resumed its use in your factory?

A. For one reason, my firm has a very large contract for a special shade of mixed paint for the Philadelphia Elevated Railway Company, and I probably will find sublimed white lead suitable for that mixture.

Q. That is why then, you have returned to the use of sublimed white lead lately, is it?

A. Yes sir.

Q. For about how many years did you exclude it pretty largely from use in the manufacture of mixed paints in your factory?

A. I practically never excluded it; I always had some.

Q. How long did you exclude it in the sense in which you have used that term in your previous answers?

A. I cannot answer that any differently because I practically never excluded it; I always had some of it on hand.

Q. Using it in the sense that you have stated that you employed zinc lead white rather than the sublimed white lead in your factory, how long did that difference exist?

A. Oh, that is seven years ago.

Q. And how recently is it that you have resumed the use of the sublimed white lead, within the past year?

A. Within the past month.

Q. Since you gave your testimony here upon your examination in chief?

A. Not particularly. I had some on hand while I was here on the witness stand.

Q. Well, you have bought some since you were here and testified before, haven't you?

A. Because we were running low in our stock.

Q. You said that the sublimed white lead was better than zinc lead white because it was whiter; did you say so?

A. Better for making white paints, yes sir.

Q. Well, you didn't mention before any objection to zinc lead white on the ground of its lacking good white color, did you?

A. No sir, but we are not manufacturers of white paints, very largely.

Q. Well, you do not recognize a defect in the zinc lead white in the matter of its producing a permanent white color, do you?

A. I do not.

Q. Well, what is the objection in the matter of color, then, on account of which you have recently resumed more extensively the use of sublimed white lead in your factory?

A. I am making a particular shade of greenish gray and I find that the color or the tone of the zinc lead interfers with making that particular shade.

Q. I understood you to say, in answer to Mr. Zeisler, that zinc lead white had possessed uniformity on the matter of color within the past seven years; is that your testimony?

A. Yes sir.

Q. *How was it prior to the last seven years? Did it lack uniformity?*

A. *I didn't know it prior to that time.*

Q. Do you mean that zinc lead white was so little known as a commercial product in the manufacture of mixed paints that, as a chemist and practical manufacturer, you had not run across it until seven years ago?

A. It was made so far in the west that I

don't believe it was ever offered on the eastern coast until seven years ago.

Q. Then whatever is known about its valuable qualities as an ingredient in the preparation of mixed paints by eastern chemists and eastern manufacturers is the result of only seven years' experience with it, is it?

A. No sir, it only refers to me; I can't answer for what the other chemists know or don't know.

Q. But you have just said in a previous answer that you don't think zinc lead white appeared in the east until about seven years ago?

A. That wouldn't prevent another chemist from finding out something about it.

Q. If it had been there as a commercial product and a recognized pigment, of value in the preparation of mixed paints, would you have been ignorant of the fact?

A. Possibly I would.

Q. Well, don't you know, as a matter of fact, that it is true that this pigment did not extensively appear, or generally appear in the eastern part of the United States until about seven years ago?

A. I do not. (670-674).

He also stated it was within the last six or seven years that the manufacture of lithopone had been greatly improved (687). Zinc lead white possessing uniformity of composition has only been produced in the last seven years or at least has only been known for that length of time to this witness.

Mr. Lane, on rebuttal, also stated that within the last six years zinc lead white has not varied more than 5 per cent in its composition and in the last nine months not more than 2 per cent (702). Mr. Lane who is the manager of manufacturing trades of complainant, Patton Paint Co., was the third witness for complainants. He testified that he entered the paint manufacturing business in 1885 at the age of fifteen; that as a result of many practical tests he early became

convinced of the superior qualities of the so-called substituted pigments over carbonate of lead and oxide of zinc (257, 293). Upon cross-examination he testified his first experience with sublimed white lead began in 1893, prior to which time he had not seen it and knew nothing whatever about it. At that period the chemical literature on the subject of paint was destitute of any reference to sublimed white lead (304-5).

Q. And up to that time, of course, it not having been in any general use, there had been no demonstration by actual lapse of time as to its durability as a pigment, had there?

A. Not as far as I am concerned, up until the time I met it and experimented with it.

Q. Well, that is what I am asking you; there had been none prior to that time?

A. I will not say that.

Q. You couldn't find it in the literature, did you?

A. I didn't hunt for it.

Q. Well, you didn't find it, did you?

A. No sir.

Q. You didn't have before you any materials, houses or other objects which had been covered with a paint in which sublimed white lead was an ingredient as a pigment and which had stood for a series of years, did you?

A. Not prior to '93, no sir.

Q. Then when you took the matter up in 1893 for investigation you were without aid from either the books or from a physical inspection of the test which such paint had stood, as to the durable qualities imparted to paint by the use of sublimed white lead as a pigment

A. I was entirely in the dark.

Q. Now, I understood you to say that this concern entered upon the manufacture of mixed paints in 1894?

A. Yes sir, December. We didn't put any on the market until 1895.

Q. And your first attention was called to sublimed white lead in 1893?

A. Yes sir.

Q. Then such investigations and tests as you made or could make on the important question of the durability imparted to paint by the use of sublimed white lead was confined necessarily from the time 1893 to 1894, was it not?

A. To 1895, sir; we didn't put the paint upon the market until 1895.

Q. Well, you began manufacturing paint some time before you put it on the market, didn't you?

A. Yes sir, the week before Christmas.

Q. Was the week before Christmas in 1894 the time you referred to in your direct examination when you first selected sublimed white lead as the ingredient you were going to use?

A. Yes sir.

Q. Well, didn't it take you some time after you had arrived at your decision to get together a body of it for use in your factory?

A. No sir, we had it in the factory.

Q. You had it in the factory before you had reached the conclusion that you would employ it as a pigment?

A. Before I had reached the conclusion that we would employ it as a mixed paint pigment.

Q. You had it there for other purposes?

A. Yes sir.

Q. Well, at the outside it could not have been more than a year and a half after you made your first investigations as to the value and quality of sublimed white lead until your concern began to use it in the preparation of mixed paints, could it?

A. No sir, it could not.

Q. Now, will you as an expert, Mr. Lane, and a man well and widely acquainted with this whole subject, state to the court and do you wish your testimony to go to the court to the effect that, in your opinion, as such an expert, a test

as to the durable qualities of a pigment which is confined to an observation of 18 months is a sufficient and proper test upon that feature of the matter?

A. I want my testimony to go to the court in that way, as compared with the other pigments or statutory pigments, that I was satisfied it had beaten it so badly that I was satisfied and our president was satisfied that it was a better pigment.

Q. The observation which you made in that 18 months, when you were twenty-two years of age, had satisfied you beyond all question and controversy that the experience of three or four hundred years of the world in the matter of carbonate of lead and of twenty to thirty years in the matter of the value of oxide of zinc was not as satisfactory, did not show those pigments to be as satisfactory as this 18 months' observation upon your part of the sublimed white lead?

A. During those three or four hundred years I did not exist and didn't know anything about what had been done, and I simply took the findings of my own experiments and tests. I was a young man and wanted to satisfy myself as to the relative values of all the pigments I could find.

Q. You had, of course, the enthusiasm of a young man, in finding anything new that was better than the old?

A. I had; there is no question about that, sir.

Q. And you felt perfectly satisfied to match the results of that 18 months of investigation against what appeared to be the unanimous conclusion, or almost unanimous conclusion of the scientific world in regard to the really valuable qualities of carbonate of lead and oxide of zinc, didn't you?

A. I did and I had a very high opinion of the president of our company as a paint manufacturer.

Q. Well, I am asking you more about your own opinion than I am about his, because you are on the stand and he is not.

A. Well, that is my opinion. (305-308).

* * * * * * * * * * * *

Q. What is the position you hold?

A. I am manager of manufacturing trades.

Q. Well, as such manager, you determine, in a large sense, I mean, the selection of pigments, of ingredients for your mixed paints?

A. No sir.

Q. You haven't anything to do with that?

A. Nothing to do with the mixed paint whatever, I do not know the formulas of the Patton Paint Company's goods.

Q. Well, of course, you are a great believer in sublimed white lead as a pigment, aren't you?

A. I am.

Q. And you have detailed here the most serious objections, which, in your opinion, exist against the use of carbonate of lead?

A. Yes sir.

Q. Its poor qualities, as you have set them out at length in your testimony?

A. Yes sir.

Q. Well, of course, you are aware that your employers are using the carbonate of lead quite largely in their productions, are you?

A. I understand so, in their mixed paints.

Q. No. 39, page 593. (Folio 93).

A. Yes sir.

Q. Now, in the preparation of that paint, the Patton Paint Company, of which you are the manager of manufacturing trade, employes 26.14 per cent. of carbonate of lead and 56.64 per cent. of zinc oxide, does it not?

Mr. Zeisler: Objected to as not being cross examination, this being entirely immaterial and incompetent, the witness having stated that he does not know the formulas of the Patton Paint Company's paints.

A. It is so alleged in this Bulletin, No. 67.

Q. Well, from your general knowledge of the business of the Patton Paint Company, you must know that they employ large quantities of carbonate of lead and oxide of zinc in the manufacture of mixed paints, don't you?

A. Yes sir, they do.

Q. That is a policy which, in your judgment, must necessarily result in putting out upon the market an exceedingly inferior and poor quality of mixed paint, isn''t it?

A. I didn't say so.

Q. Haven't you described at great length that pure carbonate of lead, alone or in combination with oxide of zinc, will not produce a satisfactory paint?

A. I didn't say it would produce a satisfactory paint.

Q. Haven't you said that, at the expiration of 18 months of observation, the results which the combination of those two pigments produce were so poor in contrast with the results which came from the employment of sublimed white lead as a pigment, that you hadn't any doubt whatever where the superiority lay?

A. I did. The Patton Paint Company are using silica, class "B" pigments, and improving their paint thereby.

Q. But haven't you already said, in your direct testimony, that the use of silica with sublimed white lead would be much better and would produce a much more valuable paint than when used with carbonate of lead as the principal pigment?

A. I did.

Q. Then, to your knowledge, the Patton Paint Company, is putting out upon the market in its mixed paints what you know, as the result of your investigation, to be a much inferior product than it would be if they employed sublimed white lead?

A. I didn't say that. They would make it better by using sublimed white lead.

Q. Have you advertised to the world generally that your company was putting out what you regarded as a somewhat inferior product?

A. Inasmuch as I have nothing to do with the sale and manufacture of mixed paints, I have said nothing, advertised or otherwise.

Q. *Have you endeavored, in your capacity as an officer of this company, or manager of one of its departments, to induce them to drop the use of carbonate of lead and substitute the use of sublimed white lead?*

A. *I have.*

Q. *And so far you haven't succeeded?*

A. *I am succeeding.*

Q. But you haven't succeeded yet to the point of convincing the responsible officers of your company that it is desirable for them to drop out carbonate of lead, have you?

A. The responsible officer of our company is a very busy man and isn't present at the factory one-half of his time.

Q. I ask the witness to answer the question.

(The question was read.)

A. Not wholly.

Q. And if the analysis which is found in No. 39 of this bulletin is correct, your company, when this particular sample or kind of paint was put out, was using 26.14 per cent. of carbonate of lead?

A. Yes sir.

Q. And wasn't using any sublimed lead whatever?

A. Not in that sample, no sir.

Q. Is the Patton Paint Company putting out at this time upon the market any mixed white paint in which sublimed lead is used as a pigment?

A. Not under the name of Patton Sun-Proof Paint; at least I have not seen it.

Q. Well, do you regard Patton's Sun-Proof Liquid Paint as being a superior article to any other mixed paint which that company puts out on the market?

A. Superior to any other they put out?

Q. Yes, is that their best quality of paint?

A. That is their best quality of mixed paint.

Q. And sells for more money than anything else?

A. *And sells for more money than any other grade of their mixed paint.*

Q. *And is the one quality of mixed paint in which there is an entire absence of sublimed white lead?*

A. *Yes sir.*

Q. I understood you to say, Mr. Lane, that the sublimed white lead was uniform in its composition and was composed substantially of 75 per cent. of sulphate of lead, 20 per cent. of oxide of lead, and five per cent. of oxide of zinc; is that right substantially?

A. Yes sir.

Q. Now, those percentages are the exact ones which are given in Prof. Ladd's bulletin and which appear upon page 582 (folio 82) of the bulletin, are they?

A. Yes sir.

Q. Do I understand you to agree with Mr. Toch in the testimony which he gave yesterday, that the process of producing sublimed white lead has undergone many changes and that, with time and the new discoveries and improvements that are made, that it is a good deal improved in quality over what it was at first?

A. Yes sir.

Q. And the sublimed lead which you have to-day upon the markets is a very different product from what it was originally, considerably better, and that improvement has gone on steadily has it, for the last fifteen or twenty years?

A. Apparently.

Q. And it has grown less variable as to its constituent parts?

A. Yes sir.

Q. Well, now, is this percentage, this table of percentages which you have given and which

appears in Prof. Ladd's bulletin, one which characterizes sublimed lead as produced now or is it the one which characterized it when you adopted it in 1894 in Buffalo?

A. Well, it is nearer perfect than it was then, in my opinion.

Q. You wouldn't claim that the sublimed lead upon the market at the time you investigated it and adopted it in Buffalo in 1894, was anything like as uniform in its composition as the product of today, would you?

A. No sir.

Q. Then you don't claim that the sublimed lead which you began to employ in 1894 was made up of these percentages to an unvarying degree in the different samples, do you?

A. It was not as stable as it is to-day; we allowed five per cent. latitude in the lead sulphate. (322-326.)

Upon re-direct examination Mr. Lane said:

Q. Now, I understand you have been associated with the concern of the Patton Paint Company only about nine months?

A. The Patton Paint Company, yes sir. My term of employment started there on the 15th of April, but I was detained and didn't report until the 17th of April.

Q. About nine months then?

A. About nine months.

Q. Have you been consulted by the managers of that concern with reference to the propriety or advisability of using sublimed white lead as a substitute for carbonate of lead?

A. As applied to what?

Q. In the mixed paints?

A. No sir, but I have spoken to our secretary and treasurer, Mr. Luddington Patton, telling him the good qualities of sublimed white lead; I was not consulted, I volunteered the information; and he immediately started an exhaustive test and those tests are being carried on to-day. I personally have been looking at them but mak-

ing no remarks to Mr. Patton, his mixed paint foreman or his chemists, simply examining them and making no remarks. That was understood amongst us that each man would retain his opinion until the final examination.

Q. And they have not yet told you what their determination is in regard to adopting sublimed white lead as an ingredient of their mixed paint, have they?

A. No sir, because they have not decided yet. (341-342).

Upon re-cross examination Mr. Lane testified:

Q. These tests which I understand the Patton Paint Company is now making of the value of sublimed lead as a pigment, were the results of this suggestion which you made to the managers, that they employ it?

A. I won't say that, because they had started some tests prior to my coming there, but they have made more since I have been there.

Q. About when did these tests begin, as nearly as you are advised?

A. Well, we put out a number of tests in June, quite a number of tests in June.

Q. And you have been looking at them from time to time, you say?

A. Oh, yes.

Q. And when will the tests have reached the life, or a duration which, in your opinion, will enable you to get results from them that will be satisfactory?

A. No, not that way. When, in Mr. Patton's opinion, as I am not in charge of the department.

Q. *Well, how long do you expect those tests to continue before you reach results or agree upon results?*

A. *About two years.*

Q. *Now, Mr. Patton, of course, has known of sublimed lead at least as long as you have, hasn't he?*

A. *I should say so.*

Q. *And you have known of it since 1893?*

A. *That is right.*

Q. *That is twelve years?*

A. *Yes sir.*

Q. *But, up to the present time, Mr. Patton, as a manufacturer of mixed paints and especially as the manufacturer of this Sun-Proof Liquid Paint, hasn't yet reached the conclusion that he may use the sublimed lead as a pigment in that paint, has he?*

A. *No, I think not.*

Q. *And therefore the wisdom or desirability of using this sublimed white lead as a pigment in that paint has not yet been sufficiently established so that Mr. Patton is ready to introduce it without himself making these personal tests, has he?*

A. *This is as I understand it, of course.*

Q. Well, you look upon Mr. Patton as a representative paint manufacturer, don't you?

A. I look upon Mr. Patton as a very clever man, not necessarily a clever paint man.

Q. And he has been in the business a good while, has he?

A. Yes, he has.

Q. He is a highly reputable paint manufacturer, is he?

A. Yes sir.

Q. A member of this association here?

A. A member of this association here, yes sir.

Q. Has been engaged for a great many years in the manufacture of paints, has he?

A. He has been associated with his brother and his father a great number of years.

Q. Are they large producers of paint?

A. Yes, quite large.

Q. Well, how large?

A. Well, I don't know the value of their output, in as much as I am not in the accounting department and not a member of the firm, naturally

I would'nt see the figures; I can make a guess for you.

Q. Are they within the class of one hundred referred to by Mr. Toch yesterday?

A. Oh, yes.

Q. Very well up in that class, are they?

A. Yes indeed.

Q. And of course they have been in business for a good many years, you say?

A. Good many years.

Q. How many, do you think?

A. I believe that the Patton Paint Company, under the name of James E. Patton, has been in business since '53.

Q. And, of course, like other large manufacturers of paint, they have kept chemists in their employ, have they?

A. Yes sir, late years at least, but not in early years they didn't.

Q. And, as far as you know, it has been the policy of this company to keep abreast of the time in looking into new materials which appeared upon the market, suitable or which can be adopted for use in the manufacture of paints?

A. In the last few years, yes sir.

Q. That is, you know they have within the past few years.

A. Yes sir, and only within the last few years.

Q. And their success in building up so large a business as you say they have built up would indicate to your mind, aside from any exact knowledge on the subject, that they have kept themselves well posted on the subject since they started in business, would it not?

A. Yes sir.

Q. And you therefore may fairly cite Mr. Patton and his company as an illustration of the case of at least one large manufacturer in your knowledge who, up to the present time, is not satisfied as to the value of sublimed lead in the putting out or in the production of a mixed paint,

and desires to verify the conclusions of others by his own personal tests?

A. Yes sir. Mr. Patton is not a paint maker, not a practical paint maker.

Q. No, but he has been making paint since fifty something?

A. He has not; he is a young man.

Q. Well, his father has been engaged in making it?

A. His father?

Q. Well, wasn't Mr. Patton raised in the business with his father?

A. Mr. Patton has only been out of college a few years, as I understand it.

Q. Then what you mean to imply, I suppose, by your remark is that the predecessor of the present Mr. Patton was a little behind the times?

A. That is agreed.

Q. That is just what you think about it, is it?

A. That is agreed.

Q. That is, it is agreed by you, at any rate?

A. And his two sons.

Q. But his son still don't accept your conclusion without verifying it by his own personal examination and test, does he?

A. No.

Q. Well, to that extent he doesn't agree with you, does he?

A. He doesn't disagree with me.

Q. No, and he doesn't agree either, so far as I can make out. He doesn't use sublimed lead, at any rate.

A. He does use sublimed lead; pardon me. (350-353).

Prof. E. F. Ladd was the first of defendant's witnesses:

He is a chemist by profession, holding the chair of Professor of Chemistry in the North Dakota Agricultural College and is also chemist of the Government Experimental station at Fargo,

North Dakota. He has been conspicuous in the movement of the last five years against the adulteration of foods, drugs, paints, etc., etc. Basing his conclusions upon his knowledge of chemistry applied to the substances under consideration, and in the light of eminent scientific authorities quoted in his testimony, he expressed the opinion that carbonate of lead and oxide of zinc, when used as pigments in preparation of mixed paint, are superior in quality to those mentioned in subparagraphs (A) and (B) of the bill. In his opinion, the chemical union or combination formed between the lead hydrate of the carbonate of lead, and linseed oil is a virtue and imparts to the paint thus produced certain valuable qualities not found in one wherein the pigment employed is inert to linseed oil (368, 371). The specific objections to sublimed white lead mentioned by Prof. Ladd are: lack of uniformity in composition; tendency to harden in the can; difficulty of brushing out or spreading, especially in cold weather (376). The witness described zinc lead white and zinc from western ores as lacking uniformity of composition; the percentages of both lead sulphate and zinc sulphate varying widely. On account of this lack of uniformity "the manufacturer could not depend upon two lots as producing the same effect, the same result in the first place." In the second place the sulphate of lead is recognized as being objectionable in the paint by some of the authorities at least (378).

Q. You are acquainted with opaque white pigment which has been referred to as lithopone?

A. To some extent from the analysis, yes sir.

Q. In your opinion, what are the valuable qualities of lithopone when used as an ingredient in the preparation of paint and what are the objections, if any, to its use for that purpose?

A. Simply its cheapness would be the only thing I should say for recommending it in the preparation of mixed paints and its objections

are lack of uniformity and color and composition and the fact that it can not be used in connection with lead or can not be used as a paint satisfactorily where lead paints have been previously employed on buildings.

Q. What is the tendency of paint in which lithophone is used as a basis to become streaked or to run down, when applied, for instance to the side of a house?

A. Why, it becomes colored and darker and streaky in appearance from its reaction with the lead, if it were present in the previous coats of paint.

Q. In composition with linseed oil would lithophone when used as a basis, form a chemical union, or is it an inert material?

A. I could not say from actual examination there. I would not expect it to from the same kind of a combination as is formed with white lead. (381-382).

As a commercial product sublimed white lead has been upon the market in this country about twenty years; zinc lead white and zinc from western ores for a much shorter period. Lithophone from the first has been in use about the same length of time as sublimed white lead; but only recently has it come into general use (383). Barytes is used in mixed paint chiefly "as an ingredient for the reduction of the cost of paint" (383). It costs less than one cent a pound. It is an inert material. In the opinion of the witness, silica, silicate of magnesium and calcium carbonate are all inert to linseed oil, form no chemical union therewith, are not true pigments and are used chiefly to reduce the cost of the paint in which they are employed. Calcium carbonate is some times used in a small amount to neutralize the acidity of the oil, but principally as a cheapening ingredient in the production of the paint. One of its objections is that it is alkaline in its nature and tends to destroy the oil and rot it (385). To a certin extent it is inert and on the

other hand it is alkali and acts upon the linseed oil, decomposing it and destroying the life of it and if there is acid present it acts on the acid portion to neutralize the acidity, this being the only advantage which it seems to offer. Hydrated sulphate of lime has no valuable qualities; it cheapens the cost of the paint (386).

Prof. Ladd testified that by analyses made subsequent to the issuance of bulletin attached to his affidavit (73-104) he had determined the chemical composition of the pigment given in several of the samples as "Lead calculated as White Lead" (389). In the majority of the mixed paints sold in North Dakota, with a few unimportant exceptions, the lead pigment is carbonate of lead and not sublimed white lead (390). In sample No. 7 (90), No. 38 (92), Nos. 39 and 40 (93). No. 41 (94), No. 50 and No. 61 (100), and No. 71 (104) lead calculated as white lead was found to be carbonate and not sulphate or sublimed white lead (390-396.)

B. M. Joystad, Superintendent of the paint factories of T. L. Blood & Co., of St. Paul, gave testimony upon the reference. This witness had charge of the mixed paint department of Heath & Milligan Co., complainant, at Chicago, a number of years ago. He has been with Blood & Co. for twenty-two years; he testified that carbonate of lead was king of all pigments; that oxide of zinc is a perfect white and he knew of no other substances as valuable as pigments in the preparation of mixed paints (530). He had experimented with sublimed white lead and the paint thus produced was unsatisfactory; it hardened in the can and the working qualities were not good. He found zinc lead white to be crystalline; it crystalized after being ground in oil (532). He pronounced a first grade of Mineral Point (Wis.) zinc to be equally as good as the New Jersey zinc. T. L. Blood & Co. do not employ lithopone at all, except to make cheap enamels (534). In the preparation of the general classes of mix-

ed paints, such firm does not employ Class "B" pigments at all; because they can get better results not using them (536).

Q. In the preparation of the general classes of mixed paint which your firm prepares and puts upon the market, do you employ any of the ingredients in class "B", which are barium or barytes, silica, silicate of magnesia, calcium carbonate or hydrated sulphate of lime?

A. No, we don't use any of them.

Q. Why don't you use them?

A. Well, because we can arrive at what is as good result by not using them, and a great deal better.

Q. What in your opinion are the objections which prevent your firm from using them in the preparation of your general line of mixed paints?

A. Well, the reason we don't use them is because there is no need of using them. Of course, where there is lead lacking we find in the zinc and where there is zinc lacking we find in the lead, so that we have all the good features you can possibly ask for.

Q. Do you find any of these pigments referred to in class "B" to possess in equal degree the qualities of durability, of body, of opacity and the other desirable qualities which you have mentioned as being possessed by carbonate of lead and oxide of zinc?

A. No, I don't.

Q. Well, have the investigations of yourself and your company been such that, up to the present time, you have not found it desirable to introduce the use of any of these ingredients into the manufacture of your general lines of mixed paints?

A. Yes sir.

Q. That is true, is it?

A. Yes sir, that is true.

Q. Do you manufacture any special classes of mixed paints in which you employ any of these pigments mentioned in "B"?

A. Not mixed paint.

Q. Do you use that at all in the preparation of any paint which comes from your factory?

A. Yes sir.

Q. What kind of paint?

A. Well, in cheap paste goods.

Q. For what certain work are these cheap paste goods which you mention desired and intended to be used?

A. Well, most of them for agricultural work, and to compete for the prices.

Q. What do you mean by agricultural work?

A. Well, manufacturers of farm machinery and plows and all such things, takes altogether all that class of work.

Q. And to whom and for whom are those cheap pastes, as you have called them, principally sold and used, the manufacturers of those articles?

A. Yes.

Q. They are not put upon the market, then I understand, generally speaking, and bought by people generally all over the country, but their sale is confined largely to the manufacturers of agricultural implements?

A. Yes, that is true. Of course, it might be in some cases that they are used in mixed paint, but we never use them.

Q. Your firm never uses them?

A. No.

Q. Now, are these special paints which you have just been describing prepared upon specifications by the agricultural firms who intend to use them, as a rule?

A. No.

Q. You prepare them and sell them to that class of trade?

A. Yes, and according to prices they might get for the article. (536-538).

The durability of paints containing zinc lead white is not high (557).

The output of T. L. Blood & Co., of which Mr. Joystad is superintendent, is 100,000 gallons per year (538) and is therefore one of the 100 leading paint factories of the United States whose output equals or exceeds that figure (221).

James Robert Cook, superintendent of the Minnesota Linseed Oil & Paint Co. of Minneapolis, was defendant's third witness.

The annual output of mixed paint of this factory is over 300,000 gallons (585, 590). The witness testified he prepared all the formulas for mixed paints (586). His company employed only carbonate of lead and oxide of zinc, it does not use zinc lead white, sublimed white lead, zinc from western ores or lithopone. The latter was tried in the factory; it did not work in chromes nor with lead; the colors produced could not be depended upon; it changed color; in some light it would change to a gray and then perhaps return to the original color (592). The class "B" pigments are used only where the required shades cannot be produced with the employment of lead; the witness testified that it imparted no valuable qualities to the paint in which it was used (596, 600). Some twenty barrels of sublimed white lead were placed in the factory, but were never used (628).

The following is the opinion of Judge Amidon, delivered orally upon denying appellants' application for a temporary injunction. We insert it here for the reason that it does not appear in the printed transcript, and is valuable both because of its comprehensive statement of the principles applicable to the controversy, and also as indicating the grounds upon which disposition of the case was made.

OPINION.

Amidon, J., (orally):

It was truly said by Austin, nearly a century

ago, that the fixing upon the proper criteria of classification constitutes one of the most difficult problems of jurisprudence. A most impressive demonstration of the truth of this statement in modern times will be found in the decisions of the Supreme Court construing the last clause of the Fourteenth Amendment to the Federal Constitution, which forbids any state to deny to any person within its jurisdiction the equal protection of the laws. The court itself has expressed its consciousness of this difficulty with great force and clearness. I cannot do better than to quote its language in the 174 U. S., page 103:

"Many cases have been before this court, involving the power of state legislatures to impose special duties or liabilities upon individuals and corporations, or classes of them, and while the principles of separation between those cases which have been judged to be within the power of the legislature and those beyond its power, are not difficult of comprehension or statement, yet their application often becomes very troublesome, especially when a case is near to the dividing line. It is easy to distingnish between the full light of day and the darkness of midnight, but often very difficult to determine whether a given moment in the twilight hour is before or after that in which the light predominates over the darkness. The equal protection of the law which is guaranteed by the Fourteenth Amendment does not forbid classification. That has been asserted in the strongest language. Barbier v. Connolly, 113 U. S. 27. In that case, after in general terms declaring that the Fourteenth Amendment designed to secure the equal protection of the laws, the court added: 'But neither the amendment, broad and comprehensive as it is, nor any other amendment, was designed to interfere with the power of the state, sometimes termed its police power, to prescribe regulations to promote the health, peace, morals, education and good order of the people, and to

legislate so as to increase the industries of the state, develop its resources, and add to its wealth and prosperity. From the very necessities of society, legislation of a special character, having these objects in view, must often be had in certain districts, such as for draining marshes and irrigating arid plains. Special burdens are often necessary for general benefits—for supplying water, preventing fires, lighting districts, cleaning streets, opening parks, and many other objects. Regulations for these purposes may press with more or less weight upon one than upon another, but they are designed, not to impose unequal or unnecessary restrictions upon any one, but to promote, with as little inconvenience as possible, the general good. Though, in many respects, necessarily special in their character, they do not furnish just ground or complaint if they operate alike upon all persons and property under the same circumstances and conditions. Class legislation, discriminating against some and favoring others, is prohibited, but legislation which, in carrying out a public purpose, is limited in its application, if within the sphere of its operation it affects alike all persons similarly situated, is not within the amendment.'

This declaration has, in various language, been often repeated, and the power of classification upheld whenever such classification proceeds upon any difference which has a reasonable relation to the object sought to be accomplished. It is also a maxim of constitutional law that a legislature is presumed to have acted within constitutional limits, upon full knowledge of the facts, and with the purpose of promoting the interests of the people as a whole, and courts will not lightly hold that an act duly passed by the legislature was one in the enactment of which it has transcended its power. On the other hand, it is also true that the equal protection guaranteed by the Constitution forbids the legislature to select a person, natural

or artificial, and impose upon him or it burdens and liabilities which are not cast upon others similarly situated. It cannot pick out one individual, or one corporation and enact that whenever he or it is sued the judgment shall be for double damages, or subject to an attorney fee in favor of the plaintiff, when no other individual or corporation is subjected to the same rule. Neither can it make a classification of individuals or corporations which is purely arbitrary, and impose upon such class special burdens and liabilities. While cases on either side and far away from the dividing line are easy of disposition, the difficulty arises as the statute in question comes near the line of separation. Is the classification or discrimination prescribed thereby purely arbitrary or has it some basis in that which has a reasonable relation to the object sought to be accomplished? It is not at all to be wondered at that as these doubtful cases come before this court the justices have often divided in opinion. To some the statute presented seemed a mere arbitrary selection; to others it appeared that there was some reasonable basis of classification."

The leading authority in which the Supreme Court construed this provision of the Fourteenth Amendment is the one that has been frequently cited to me in this case, namely, the case of Gulf, Colorado & Santa Fe Railroad Company vs. Ellis, reported in 165 U. S. at page 150. In that case a statute of Texas allowed to plaintiffs in all suits against railroad companies in which the amount involved was less than $50.00, if successful, an attorney's fee of $10.00, but allowed no such fee to the defendant if the plaintiff was unsuccessful. It was held that this statute denied to railroad companies the equal protection of the law, that the classification was purely abritrary and had no proper relation to the subject with which it dealt. The court stood six to three in that case. A very similar question came before the court again in the case from which I have just read,

Atchison, Topeka & Santa Fe Railroad Company vs. Matthews, 174 U. S. 96. In that case a statute of Kansas made railroad companies, in case of a successful action against them for damages for fires caused by the operation of the road, liable for a reasonable attorney's fee. The court held this to be a constitutional exercise of the police power, regarding the attorney's fee as a penalty imposed to compel railroads to exercise care in the operation of their trains. The court in this case stood five to four. The opinion is written by Mr. Justice Brewer, the same judge who wrote the opinion in the Ellis case. He distinguishes the case upon the ground that the latter was an exercise of the police power, while the Texas case applied to all claims against railroads, both those in contract and in tort, and for that reason could not properly be referred to the police power. A peculiar feature of these two cases is that the dissenting judges in the Ellis case held the Texas statute to be valid as a proper exercise of the police power to shield the weak against the strong, thus holding the very feature to be present in the Ellis case which Justice Brewer advanced for holding the Kansas statute constitutional. Mr. Justice Harlan and the three judges who concurred with him in the Matthews case point out this identity of the two statutes and present what seems to be an unanswerable argument to show that the two cases are in irreconcilable conflict. Judge Harlan takes the statute in the Kansas case and lays it upon the statute in the Texas case, and the interpretation which was put upon that statute, and then draws an argument as to the identity of the two statutes as to all matters material to the question with which the statutes attempted to deal, and it would seem to me that he demonstrates that there is between the two statutes no such difference as ought to distinguish in the application of a constitutional provision. The question came again before the Supreme Court in the case of Fidelity Mutual Life Association vs. Mettler, in the 185

U. S. 308. In that case there was a classification of insurance companies and the statute provided that as to certain life insurance companies, in case they resisted payment of a loss and a successful suit was brought against them, they should be liable for an attorney's fee, as I remember the provision; but there was exempted from this condition fire, marine and inland insurance companies and mutual benefit and relief organizations; life insurance companies alone were made liable in that case for resisting payment of a loss. And yet the Supreme Court there sustained the statute as a proper classification, notwithstanding the decision in the Ellis case.

"If, however, notwithstanding the acceptance of these conditions, the constitutionality of the particular condition were nevertheless open to question, we must decline to sustain the objection. The reasoning in Railway Company vs. Matthews, 174 U. S. 96, applies rather than that in Railway Company vs. Ellis. The ground for placing life and health insurance companies in a different class from fire, marine and inland insurance companies is obvious, and we think that putting them in a different class from mutual benefit and relief associations doing business through lodges, and benevolent associations of the character mentioned in the Texas statutes, is not an arbitrary classification, but rests on sufficient reason. The legislature evidently intended to distinguish between life and health insurance companies engaged in business for profit, (and we are not called on to define as to the distribution of such profits) and lodges and associations of a mutual benefit or benevolent character, having in mind also the necessity of the prompt payment of the insurance money in very many cases in order to provide the means of living of which the beneficiaries had been deprived by the death of the insured."

The court in this case stood seven to two, Justice Harlan writing a dissenting opinion and

holding that the case should not be distinguished from the Ellis case.

The question again came before the court in Farmers & Merchants Insurance Company vs. Dobney, 189 U. S. 301. That related to a statute of Nebraska. It was confined to insurance companies insuring real property, in case of a total loss, and it provided that as to such companies and in case of such a loss the court should allow the plaintiff a reasonable sum as attorney's fees, to be taxed as part of the costs. The ground of the classification which would hold good in this case was that there was a difference between real property and personal property known to the law, and that it might be needful for people to have the money promptly in case their houses were all burned down, although it would not be needful if they were partly burned down or if their household goods were destroyed. The court in that case stood six to three. I will not take the time to read it in full, but will simply say that a consideration of all these cases satisfies me that, while the general language used in the Ellis case as an interpretation of the Fourteenth Amendment would always remain as a correct exposition of the law, as to these particular questions that were then before the Supreme Court, the Ellis case cannot now be regarded as expressing the present opinion of the Supreme Court; and I think there is conspicuous in this line of cases a tendency on the part of the Supreme Court to leave the legislature a much larger discretion in the matter of classification than one would have thought possible at the time the Ellis case was announced.

The next case that was cited upon the argument of the law questions involved in the present case, and the next case in which this provision of the constitution was carefully examined by the Supreme Court, was that of Connolly vs. Union Sewer Pipe Company, reported in 184 U. S. 540. The statute involved in that case defined a trust with great minuteness and made it a crime for

any person, firm or corporation to do any of the acts embraced in that definition. It then excepted from the inhibitions of the act agricultural products and live stock while in the hands of the producers or raisers. It thus permitted producers of agricultural products and raisers of live stock to do the very acts which, if done by other members of society, were made criminal. The statute was tantamount to saying, "It shall be a felony to steal horses in the state of Illinois, but this act shall not apply to farmers." Such a classification is wholly arbitrary and capricious. The statute involved in the present case makes no such classification. It does not permit any person to practice evils against which the statute in general is directed. The primary object of the act is to compel every package containing mixed paint to proclaim the ingredients of which it is composed. A package containing mixed paints composed of the ingredients named in the statute need not be labeled, but such a package, when considered in connection with the statute, of which all must take notice, announces its contents as truly as if it were labeled.

The last case to come before the Supreme Court in which this subject is carefully examined is the Missouri, Kansas & Texas Railway Company vs. May, 194 U. S. 267. The opinions in this case, both of the court and the dissenting judges, are brief and I will read them:

"This is an action to recover a penalty of twenty-five dollars, brought by the owner of a farm continguous to the railroad of the plaintiff in error, on the ground that the latter has allowed Johnson grass to mature and go to seed upon its road. The penalty is given to contiguous owners by a Texas statute of 1901, chapter 117, directed solely against railroad companies for permitting such grass or Russian thistle to go to seed upon their right of way, subject, however, to the condition that the plaintiff has not done the same

thing. The case is brought here on the ground that the statute is contrary to the Fourteenth Amendment of the Constitution of the United States.

It is admitted that Johnson grass is a menace to crops, that it is propagated only by seed, and that a general regulation of it for the protection of farming would be valid. It is admitted also that legislation may be directed against a class when any fair ground for the discrimination exists. But it is said that this particular subjection of railroad companies to a liability not imposed on other owners of land on which Johnson grass may grow, is so arbitrary as to amount to a denial of the equal protection of the laws. There is no dispute about general principles. The question is whether this case lies on one side or the other of a line which has to be worked out between cases differing only in degree. With regard to the manner in which such a question should be approached, it is obvious that the legislature is the only judge of the policy of a proposed discrimination. The principle is similar to that which is established with regard to a decision of Congress that certain means are necessary and proper to carry out one of its express powers. McCulloch vs. Maryland, 4 Wheat. 316. When a state legislature has declared that in its opinion policy requires a certain measure, its action should not be disturbed by the courts under the Fourteenth Amendment, unless they can see clearly that there is no fair reason for the law that would not require with equal force its extension to others whom it leaves untouched.

Approaching the question in this way we feel unable to say that the law before us may not have been justified by local conditions. It would have been more obviously fair to extend the regulation at least to highways. But it may have been found, for all that we know, that the seed of Johnson grass is dropped from the cars in such quantities as to cause special trouble. It may be that

the neglected strips occupied by railroads afford a ground where noxious weeds especially flourish, and that whereas self-interest leads the owners of farms to keep down pests, the railroad companies have done nothing in a matter which concerns their neighbors only. Other reasons may be imagined. Great constitutional provisions must be administered with caution. Some play must be allowed for the joints of the machine, and it must be remembered that legislatures are ultimate guardians of the liberties and welfare of the people in quite as great a degree as the courts."

Mr. Justice Brewer concurred in the judgment, but Mr. Justice Brown, Mr. Justice White and Mr. Justice McKenna dissented to the opinion Mr. Justice Brown writes a dissenting opinion:

"I am unable to concur in the opinion of the court in this case. While fully conceding that the legislature is the only judge of the policy of a proposed discrimination, it is not the only judge of its legality. Doubtless great weight will be given to its judgment in that regard, and the legislation will not be held invalid, if it be founded upon a real distinction in principle between persons or corporations of the same class. Upon this principle spark arresters may be required upon locomotives when they are not required upon other smokestacks, because of their greater liability to communicate fires to adjoining property; so, although other proprietors are not bound to fence their lands, railway companies may be required to do so to prevent the straying of cattle upon their tracks. Upon the same principle gates and guards may be required at railway crossings when the same would be entirely necessary at the crossing of ordinary highways. Other discriminating regulations made necessary by the peculiar business and danger incident to railway transportation may be readily imagined.

In this case, however, the railway is not pursued as such, but merely as the proprietor of certain land alongside its track, and no reason can

be conjectured why an obnoxious form of weed, growing upon its land, should be more detrimental than the same weed growing upon adjoining lands. The railway is not made the sole object of the statutory prohibition by reason of the fact that it is a railway, and the discrimination against it seems to be purely arbitrary. The only distinction suggested in support of the ordinance is that the seed of Johnson grass may be dropped from the cars in such quantities as to cause special trouble; but there is not only no evidence of such fact, but it is highly improbable that the seed of a noxious grass of this kind would be carried upon the cars at all. It is also suggested that the self-interest of owners of farms to keep down pests of this kind might be relied upon to prevent their growth. But this tends merely to show that if the law were made general, it would be more readily obeyed by private land proprietors than by the railway. It may be that railways are less given to the observance of precautions of individual property, but that does not create a distinction in principle. It merely tends to show that if the law were made general the railway companies would be oftener prosecuted than other proprietors. If Johnson grass growing upon railway tracks be a nuisance, it is equally so when growing upon the other side of the line fence, and I think the law should be made general to avoid the charge of an arbitrary discrimination. If the land owned by every corporation were held to this liability, while the land of individuals were exempt, the discrimination would be more conspicuously unjust in its appearance, but scarcely more so in its reality."

I have cited and read from the opinion at length to show further the trend of the decisions of the Supreme Court.

In a decision which has just been rendered and which is not as yet found in the bound volumes, it is said by the Supreme Court negatively that the classification, in order to comply with the

Fourteenth Amendment must not be purely arbitrary and capricious, and affirmatively that it must involve the exercise of legislative discretion and judgment. It is also said, in another opinion not yet reported, that the determination of the question as to whether a law violates this provision of the constitution cannot properly be rested upon over mathematical refinement. The question, therefore, presented by the present case is this: Is the classification made in the North Dakota Statute purely arbitrary and capricious or does it involve an exercise of legislative discretion and judgment. When I examine the conditions which the Supreme Court, in the decisions from which I have read, has declared justify a difference in classification, I entertain no doubt as to the proper decision of this case. The conditions which are presented by the evidence here and which appear in the bill are much more conspicuous as a basis of classification than those which the Supreme Court, in the cases to which I have already adverted, held to be a proper basis of such classification. In the first place, it is proper to consider in respect of what the classification is made. It is not classification in respect to crimes, saying that one class of acts shall be criminal and another class of acts shall be innocent. It is not a classification which says that one order or one class of a community, if it commits a certain act, shall be guilty of crime and the other, if it does the same act, shall be innocent. Neither is it a classification which, upon the one hand, prohibits the sale of one class of articles and, upon the other hand, permits the sale of another class of articles. The classification in the present statute goes to the question simply as to whether the articles in one class shall be labeled so as to disclose the contents of the package bearing the label, or shall not be labeled. It seems to me that there has been an exaggeration, both in the bill and in the argument, of the damaging effect of a label upon the sale of paints as a matter of trade. The case that

was cited to the court from the Court of Appeals of New York was a very different case. The statute there dealt with prison made goods and required all such goods to be labeled so as to conspicuously show that they were prison made goods. The prejudice which would exist as to a very large class of the community against such goods, particularly the laboring classes at whose instance this statute was passed, was such as would amount to an absolute prohibition upon the sale of the article. Now, in this case, the package is required to be labeled so as to show the contents of the package, and counsel says that if another package is allowed to contain a mixed paint without a label, the whole purchasing and trading community would say, "This package is approved by the law, we will buy it; the other package is condemned by the law as adulterated, we will shun it." In the first place I should say that any such prejudice as that could be overcome by trade experience, but in the second place, and chiefly, it will depend to some extent as to how the law is administered by the department of the state having charge of its administration, as to whether the trading community shall be made to believe that every package containing a label contains adulterated paints, while those which contain no label are pure. It is the duty of this court to assume that the law will be administered honestly and in good faith and the bulletin which has already been issued contains persuasive evidence that that will be the manner in which the law will be administered. In that bulletin Prof. Ladd has already declared that some at least of the ingredients not embraced in the statute are useful and very beneficent ingredients in the manufacture of mixed paints. He has stated that so plainly and so forcefully that it has been urged upon the court in the argument of this case that it is proof positive that that element is a beneficent element and ought not to be discriminated against, and Prof. Ladd seems to have taken the pains in his bulle-

tin to inform the public that it ought not to be discriminated against. As a basis of classification, it appears from the bill itself that the two ingredients mentioned in the statute as proper pigments are those which have been for the longest time in use, that their use as proper pigments is well established and has been for a long term of years. The evidence in this case shows also that there is a difference of opinion among text writers and among paint manufacturers as to the utility of the ingredients which are mentioned in class "A" and class "B" in the bill. I will not say that the weight of the evidence here shows that those elements are adulterants, not by any means. If I were sitting as a court to pass upon that question where the weight of evidence was controlling, I should say at once that the weight of evidence in this case demonstrates that as to class "A" pigments the ingredients are very useful and in many cases indispensable elements in the manufacture of paints. But I cannot determine the question that is presented before me upon a simple weighing of the evidence. If looking out upon the field of paint manufacturing as it exists, there are substantial reasons why the legislature should make the classification as it has, it would not be any ground for the court to declare the law unconstitutional because the court is of the opinion that a wiser classification could have been made, a classification more consistent with the proper conduct of the paint business. The determination of the constitutionality will rest simply upon the question: Is this classification purely arbitrary and capricious without any substantial ground for it to rest upon? If it is, then it is unconstitutional. If not, then it is not unconstitutional, however unwise the law may be, however unwise or unjust or impolitic the classification may be. Then, as to a large number of other ingredients mentioned in the bill, the evidence shows that they have been frequently used for purposes of adulteration. It may be that at the

present time they are not so used but, if the legislature, looking out on the ingredients that enter into the manufacture of mixed paints and making a classification, finds that certain ingredients have been used largely for adulteration, they may properly take that element into consideration in making their classification to determine whether a lable shall be put upon the packages or shall not be put upon them.

I am entirely satisfied that, in sustaining this law and holding this classification to be no violation of the Fourteenth Amendment, this decision is based upon grounds of distinction that are much more pronounced and clear than the distinction which the Supreme Court, in the numerous cases to which I have referred, held to be a proper ground of classification. The application for a preliminary injunction will be denied and the temporary restraining order heretofore granted will be vacated and set aside."

ARGUMENT.

In the statement of facts we have gathered together portions of the record bearing upon the lack of universal recognition among paint manufacturers and text books touching the valuable qualities of the so-called substituted pigments; we do not claim this to be a complete summary of the evidence; we do not deem it incumbent upon defendant to prove by a preponderance of the evidence that the substituted pigments are not possessed of the qualities ascribed to them in subparagraphs "a" and "b" of the bill. For the purpose of sustaining the validity of the statute it is only necessary to show that there is a substantial difference of opinion as to such efficiency. The legislature is deemed to have been familiar with the situation in respect of the industry of the manufacture of mixed paint as it existed when the act in question was enacted. The statute is entitled, "An act to prevent the adulteration of, and deception in the sale of white lead and mixed paints."

The only ground urged against its constitutionality is that it contravenes those provisions of the Fourteenth Amendment which forbid the taking of property without due process of law and secure to all the equal protection of the law.

No claim is made and no rights are asserted under the commerce clause of the Eighth Section of Article One of the Constitution.

Complainants are therefore confined in this case to the assertion of such rights only as are guaranteed to them by the Fourteenth Amendment. Their contention cannot be supported by any reasoning or any decisions based upon rights secured by the *commerce clause.*

Cox vs. Texas, 202 U. S. 446.

An examination of the entire record leaves no doubt that there were glaring evils present in the business sought to be regulated. (46-48). It is a business which touches every property owner in the state. There is scarcely an article of more common or universal use than paint. It appears that mixed paints were being offered for sale, labelled as pure white lead, in which there was no trace of such pigment. It must now be conceded that the police power may be exercised for the general well being of the community; that it embraces regulations designed to promote the public convenience or the general welfare as well as to enact regulations designed to promote the public health or public morals or the public safety.

R. R. vs. Drain Commissioners, 200 U. S. 561;
Bacon vs. Walker, 204 U. S., 317;
Lake Shore vs. Ohio, 173 U. S., 285;
N. W. Life, etc., vs. Riggs, 203 U. S., 243.

The Fourteenth Amendment does not deprive the states of the police power reserved to them at the time of the adoption of the Constitution.

Slaughter house Cases, 16 Wall, 36;
Barbier vs. Connolly, 113 U. S., 27;
Mugler vs. Kansas, 123 U. S., 623;
Powell vs. Penna., 127 U. S., 678.

The validity of a police regulation must depend upon the circumstances of each case and the character of the regulation, whether arbitrary or reasonable, and whether really designed to accomplish a legitimate public purpose. Is the legislation assailed in this action properly described in the light of the record as arbitrary, unreasonable and capricious, or did its enactment involve the exercise of legislative judgment and discretion? Is the classification based upon "some reasonable ground, some difference which bears a just and proper relation to the attempted classification, and not a mere arbitrary selection?"

Railway vs. Ellis, 165 U. S., 150.

"It is also a maxim of constitutional law that a legislature is assumed to have acted within constitutional limitations upon full knowledge of the facts and with the purpose of promoting the interests of the people as a whole, and courts will not lightly hold that an act duly passed by the legislature was one in the enactment of which it has transcended its power."

R. R. vs. Matthews, 174 U. S., 96.

Tested by these rules, the statute in question does not violate the provisions of the Fourteenth Amendment. The record discloses that the substituted pigments of class "A" are comparative-

ly new. They have been upon the market as commercial products but a few years. Concededly, the statutory pigments have been employed for a much longer period, their merits have commanded universal recognition and with their general and specific value as pigments in the preparation of paints, the public at large is familiar. These two oldest of all pigments, carbonate of lead and oxide of zinc, are placed in one class. Manufacturers employing them in the preparation of mixed paint are not required to affix a label. All other substances, when used for a like purpose, must be labelled.

We maintain the following propositions:

1. *Assuming the act sets up a standard of purity or efficiency and puts the paint containing substituted pigments at a disadvantage by requiring a label, it is yet constitutional; because the classification is warranted by the situation disclosed in the record.*

2. *The act, the validity of which is drawn in question, in fact makes no discrimination for or against complainants. It establishes no standard of purity or efficiency. It deals with carbonate of lead and oxide of zinc, with which all are familiar, by saying all persons, firms and corporations employing them as pigments in the preparation of mixed paints may do so without labeling the product.*

3. *If the act does not include paste paint (which we do not admit) such omission goes only to the completeness of the law, to its failure to deal with the whole subject. It does not render it unconstitutional. Complainants may, like all others, sell unlabeled paste paint of whatever ingredients composed.*

4. *The act in question is well calculated to prevent the perpetration of fraud; it enables intending purchasers to know what they are buying. It prevents dishonest manufacturers from palm-*

ing off upon the public cheaper substances for more expensive ones. It puts every substance, used as an ingredient, upon its own distinctive merits or lack of them and prevents the inferior article from being sold for what it is not.

5. *The law does not classify complainants as manufacturers at all; it classifies only their products, and the products of all alike, permitting the sale of one kind without a label and requiring labels as to all others. The bill does not allege and the record does not show that complainants in the manufacture of mixed paints confine themselves to the use of substituted pigments.*

First. *Assuming for purposes of argument the act establishes a standard of purity or efficiency and discriminates against the use of substituted pigments by requiring the paint wherein they are contained to be labeled, it yet does not violate the Fourteenth Amendment.*

Its enactment was warranted by the situation disclosed by the record. The evidence taken upon the reference discloses a wide divergence of opinion touching the value of class "A" and class "B" pigments where used in the preparation of mixed paint. The literature bearing upon the subject, while not extensive, supports our contention rather than that of the bill. Professor Hearst, concededly the greatest English authority, declares white lead as a pigment possesses

all the good qualities desired by a painter,—good color, body or covering power and permanency. He says it is distinguished from all other pigments by the ease with which it mixes with oil and forming a paint which readily flows from the brush, whereas most pigments, as for instance barytes, tend to work what the painter calls slimy or livery or streaky. * * * "This fact of the white lead forming a chemical combination with the oil is well known to color makers who have endeavored by the addition of basic bodies to bring about a similar action with other white pigments, such as zinc white and barytes, but so far without any great success." (515).

Professor Church in his work on Chemistry of Paints and Painting published in London in 1901, says, "On the other hand; the quality of the whiteness of the best flake white (carbonate of lead) is unimpeachable; the paint works admirably in oil and has great body. Moreover, flake white not only mixes perfectly and safely with the majority of pigments, but it serves to impart to slow drying colors its own strongly siccative character. Besides all these merits white lead possesses a valuable property which has scarcely been clearly recognized or duly appreciated, for when an old oil picture is carefully examined, it will generally be found that if any portion of its surface (of the paint, not the varnish) shows decided contractions and cracks, these are practically those portions into which lead has entered in the smallest portions, if at all. The most translucent parts, the rich glazing and the deepest shadows may be fissured but not the high lights. * * * This property of white lead seems to depend upon a combination taking place between a part of the oil with which it is ground and a part of the lead hydrate which it contains. A kind of lead soap (lead linoleate) is thus formed; this compound imparts a degree of touchness and elasticity to those forms of oil paint into which lead white enters to any considerable extent." (516).

Professor Sabin in his work on Technology of Paint and Varnish, says, "White lead and white zinc are practically the only white pigments used in oil or varnish." He characterizes the most of class "B" pigments as mere adulterants; although he says they are actually pigments of value in paint ground in watery vehicles; that barytes is somewhat better than the other adulterants and possibly has a little value of its own (512).

Prof. J. Cruickshank Smith, in his Manufacture of Paints published in London in 1901, refers to calcium carbonate as a convenient cheapening agent along with sulphate of barytes for admixture with colored pigments (513).

Professor Hearst says the object sought in the production of lithopone is to obtain a moderately priced white, possessing the good qualities of carbonate of lead and oxide of zinc (472).

Dr. Dudley, controlling the purchase annually of a million dollars worth of paints and painting material, convinced of the superiority of sublimed white lead over the statutory pigments, has yet never drawn a specification requiring its use in the paints which his company may purchase. He speaks of the pressure of more important work as explaining why such specifications have not been prepared. It is, however, most instructive to note that he recently put out what in his evidence he styled "an experiment specification," and strangely enough the pigment required to be employed was not sublimed white lead but carbonate of lead. He says, "One of the dealers wrote me a personal letter and asked if he might substitute sublimed white lead for white lead and I answered I would be glad to see a sample gallon, but afraid whether it would dry properly. He sent the sample gallon and it proved satisfactory in every sense, so far as the uses went, so far as drying." If any of the other pigments of class "A" are employed in paints bought for the Pennsylvania Company it is without any specification therefor

and is without the knowledge of its chief chemist (154).

Mr. Toch frankly admitted the existence of a well defined cleavage of opinion in the ranks of leading mixed paint manufacturers as to the usefulness and efficiency of the substituted pigments; that the manufacturer who confines himself to the use of the statutory pigments contends they are the only proper ones (222). The manifest evasions of Mr. Toch in his explanation of his own partial discontinuance of sublimed white lead and a sudden return to its use between the two dates when he gave testimony upon the reference, naturally awakens doubt whether in the actual conduct of his own business he gives it the preference to which his opinion of its alleged superiority would fairly entitle it.

Mr. Lane in plainest terms told of his efforts to induce complainant, Patton Paint Company, to substitute sublimed white lead for the carbonate in the preparation of mixed white paints. This Mr. Patton was unwilling to do until convinced of its efficiency by personal observations and tests. These tests were begun in Milwaukee in June, 1905, about three months after the passage of the North Dakota statute. The tests must continue for two years before, in Mr. Patton's opinion, satisfactory results can be obtained. Up to this time Mr. Patton does not consider that the wisdom or desirability of using sublimed white lead as a pigment in his best mixed paint has been sufficiently established.

Nor must the comparative ages of the statutory and class "A" pigments be overlooked. Carbonate of lead has been used as a paint pigment from the earliest times, zinc has been in established use for thirty years (Toch 241). According to Dr. Dudley sublimed white lead has been upon the market for about ten years or more, but the great increase in its use has been in the last five years (139). The same witness says lithopone passed out of prominence some time ago and has never

appeared prominently since. (160). According to Mr. Toch zinc made from western ores is not used in the east (196). With the exception of zinc made from western ores, the remaining class "A" pigments are of recent production. As already pointed out, so large a purchaser as Dr. Dudley knows nothing about either zinc lead white, lithopone, or zinc made from western ores. Sublimed white lead is the only one with whose value or efficiency as a paint pigment he pretended to have any acquaintance. The record discloses the existence of a controversy touching the question as to whether a substance used as a pigment in the preparation of mixed paint should or should not be inert to linseed oil. The advocates of carbonate of lead ascribe to that material as a virtue a close chemical union which it forms with oil; it is claimed that this chemical affinity or union of the lead and oil imparts a toughness and elasticity to the paint and tends to give it the quality of durability. On the other hand Dr. Dudley, Mr. Toch and Mr. Lane contend that class "A" and class "B" pigments being inert to oil and forming no chemical union with it, are, by virtue of that fact, of far greater efficiency when used in the preparation of mixed paint.

It cannot be contended that this controversy does not exist or that either scientific writers or the paint manufacturers themselves are agreed as to which contention is right; it is plainly evident that time alone will determine which theory is the proper one; it is scarcely reasonable to expect that these questions could be satisfactorily determined within the short period during which at least three of the substituted class "A" pigments have been upon the market as commercial products.

All these facts must be presumed to have been known to the legislature of North Dakota. Looking out upon the field of mixed paint manufacture there was visible a great commercial struggle. New and untried artificial substances,

sublimed white lead, zinc lead white and lithopone, were struggling for recognition in the manufacture of paints; they sought to replace the two generally recognized substances universally used for that purpose, lead and zinc. It was further apparent, while the new pigments had enthusiastic advocates, the old ones did not lack for adherents. Going among the ranks of the great manufacturers themselves, it was found about one-half clung to their prejudice in favor of the old pigments and in practice refused to adopt the new ones; they were not convinced of the latter's efficiency; in their judgment, sufficient time had not elapsed since their introduction to definitely determine their place in the art. Mr. Patton, the complainant, is in the same company with T. L. Blood and the Minnesota Linseed Oil Co., in rejecting the new pigments, although not so rigid as the latter in excluding them from all classes of his mixed paints. This being the situation, how can it be fairly claimed the classification made by the legislature is capricious and arbitrary? Far from being thus characterized the situation discloses a wise enactment, based upon conditions which amply justified it. If the manufacturers themselves are not agreed upon the established efficiency of class "A" pigments, how can it be reasonably said the legislature of North Dakota should have taken sides with the so-called "progressives" and either enthroned the substituted pigments in the seat of honor, or at least given them equal rank with carbonate and oxide? This is asking that legislation shall progress more rapidly than research and investigation; determine conflicting views as to comparative efficiencies of artificial compounds designed for a given use in the arts: do so in advance of the conclusions of men of sciense, and before a sufficient period has elapsed for practical tests and experiments to demonstrate the final conclusions to be drawn. It is to ask the legislature to award to the new and untried that which belongs

by right to the old and established. It is right the law should say, as it does do, to every intending purchaser of mixed paint, if there is no label the paint is composed alone of the old pigments, time-tried, and which you have always known, lead and zinc. There are yet other compounds, designed to accomplish the same purpose, and in which it is lawful to trade. All these compounds bear upon their face a statement of what they are. If, as a matter of fact, they are so new in the use thus made of them, that the people at large do not understand and appreciate their value, that is one of the disadvantages to which all new and untested materials must submit when they seek to displace older ones with which the public are familiar. If they do not in fact possess virtues equal to those of the older ones, it is no ground for complaint that the law does not put them all in a place of equality. If they possess merits entitling them to equality recognition will be accorded by a discriminating public as soon as their virtues have been demonstrated.

Paint manufacturers and experts, no less than scientific writers upon the subject, differ in opinion to the relative value of the various pigments for use in the preparation of mixed paint. The opinion of the consuming public likewise differs. There is a very substantial difference in the cost of manufacture, depending upon the substances used. The class "B" pigments are vastly cheaper than the statutory ones. The purchasing public is directly and vitally interested both in the *quality* and *cost* of the paint it buys. It is right an intending purchaser be enabled to act intelligently both in the matter of choosing the kind of paint he buys and also in escaping fraud and imposition. He should be allowed to make an intelligent choice. Without the aid of the statute under consideration he is not thus protected against the use of substituted pigments in the paint, nor can he know that he is not getting lead and zinc paint, the kind he has always known.

Neither can he tell that an exorbitant price is not exacted when he is in fact supplied with a paint in which class "B" pigments are, without his knowledge, employed. These considerations present adequate reasons for discrimination in the statute, if it can be said that it does in fact discriminate against the substituted pigments by requiring them, when used in the manufacture of mixed paint, to be labeled.

Second. *The act whose validity is drawn in question in fact makes no discrimination for or against complainants. It establishes no standard of purity or efficiency. It deals with carbonate of lead and oxide of zinc with which all are familiar, by saying all persons, firms and corporations employing them as pigments in the manufacture of mixed paints may do so without labeling the product.*

This is not fixing a standard of purity or excellence. It is simply permitting carbonate of lead, which has been known and used as a pigment at least two thousand years, and oxide of zinc, which has been known and used for a like purpose for thirty years, to be sold as mixed paint and without any label. These are the pigments people have always had in mind when thinking and speaking of paint. The presence of the ingredients, carbonate of lead and oxide of zinc, when used in a mixed paint, is proclaimed by the statute, with which all persons are deemed to be familiar; the requirement that all other ingredients when so used shall be labelled so as to show what they are, constitutes no discrimination at all; for, if the proof supports the allegations of sub-paragraphs "A" and "B" then the latter are superior and not inferior pigments; intending purchas-

ers are advised what they are getting and in such case, the substituted pigments making the better paint, intending purchasers will call for and buy the labeled article; thus the labeling of the paint containing the substituted pigments will, if in truth such pigments are better than the statutory pigments, in fact enhance and facilitate their sale and not embarrass or interfere with it.

In a highly organized society such as that of our age, a constant struggle goes on to evolve new solutions of old problems, to find new substances adapted to supply old needs; to make the good better, the better best. In this strife of the new against the old the public is the final arbiter. It will inevitably decide in favor of the method or the article whose fitness for the required need is best demonstrated. The law can never settle such controversies. That must always be determined by the buyer and user. The legislative act in question does not pretend to set up any standard either of purity, quality or efficiency in the matter of paint pigments. It says simply an unlabeled paint is lead and zinc. The mere absence of a label proclaims that fact. Everyone knows the law and hence understands what are the ingredients of an unlabeled paint. The law ascribes no superiority to the unlabeled article. It is composed of substances long used to make the product, substances with which all users of paint are familiar. These ingredients, united with oil, are paint, according to the common understanding of that term. Just as much so as the product obtained by churning cream is butter. Oleomargine may possess all of the good qualities of butter, may be wholesome and nutritious, may have superior purity owing to better methods of manufacture, but it is not butter. The fact that it possesses all the good qualities and in its nature will fill all the requirements sought to be obtained, does not entitle it to be labeled as butter. It is no unlawful discrimination that requires it to be labeled so as to show what it is.

It is an insult to the intelligence of the purchasing public to suppose they will, without knowledge or investigation, buy unlabelled mixed paint simply because it bears no label, or that they will on the other hand, without judgment, condemn a labeled article simply because it is labeled. The field is open alike to both classes. The legislature has determined nothing as to relative values or standards. It has provided a simple and easy method by which the consuming public may know what it buys. The final rank assigned to each pigment, statutory or substituted, will be determined by the consumer. He will judge of merits from the standpoint of actual use and by the strain of practical test. If the substituted pigments be indeed the more efficient, nothing can prevent the public from finding it out. How quickly such general public recognition will be obtained will depend upon the successful solution of the same problems which confront every manufacturer seeking to introduce a new and untried substance or article. If it be indeed superior in quality and efficiency, the label will prove an aid, not a hindrance, to the sale. It will proclaim the presence of the very ingredients which thus entitle it to superiority.

Third. *If the act does not include paste paint, it is nevertheless constitutional.* From the bill it appears that the total annual sales of paints in North Dakota and the proportions thereof representing the sale of mixed paint, made by complainants, are as follows:

	Total Sales	Mixed Paint
Heath & Milligan Mfg. Co.,	$25.000	60 per cent.
Sherwin-Williams Co.,	20,000	60 per cent.
Biedley, Vrooman Co.,	20,000	75 per cent.
T. L. Blood & Co.,		
Patton Paint Co.	10,000	60 per cent.
J. W. Masury & Son,	5,000	Large Part.
Acme White Lead & Color Works	2,000	
Detroit White Lead Wks.	10,000	25 per cent.
Devoe & Raynolds Co.	5,000	40 per cent.
John Lucas & Co.	10,000	Large Part.
Harrison Bros. & Co.	10,000	75 per cent.

The proof also shows that the output of T. L. Blood & Co. was in the proportion of sixty-six and two-thirds per cent. mixed paint (583). Professor Ladd, in his testimony, estimated that the mixed paint made up 75 per cent. of the whole of all paints sold in North Dakota (47).

The law is assailed as unconstitutional because it selects mixed paints only for legislation and leaves paste paints untouched. But this objection goes no further than to say the measure is imperfect and incomplete because it does not deal with the entire subject; that if it deals with one product of paint manufacturers, it must deal with all. The law confessedly covers from 25 per cent. to 75 per cent. of the entire manufactured products of each of complainants to the extent that those products are sold in North Dakota. As far as it extends in its operation the law includes all engaged in a certain branch, or all the product of one department, and that the leading one, of the business. If the act covered both paste and mixed paints, and nothing else, a similar objection might with equal merit be urged against it because it did not include artists' tubes. This legislation attacked a great evil and was the pioneer enactment of any substantial efficacy dealing with the adulteration of mixed paints. It is no objection to its constitutionality that it does not

comprehend all that it might do. Nor, on the other hand, is there any proof of the adulteration or mis-branding of paste paints such as characterized the traffic in mixed paints. The affidavit of Professor Ladd described at some length the situation as to mixed paints and their adulteration (47-48).

The legislation, in respect of mixed products, was urgently demanded for the correction of conditions undeniably bad, but there is not a scintilla of proof of the prevalence of similar conditions in the matter of the adulteration of paste paints. It would be idle to pass laws having no application to any existing condition requiring either correction or regulation; moreover if there do exist evils in respect of the manufacture and sale of paste paints, they may be of a wholly different character from those affected by the act and may require different legislation for their eradication. Paste paint, as purchased upon the market, is not ready for application. Oil must be added so as to reduce it to the requisite consistency. Now it is apparent painters and not the public at large would be the principal purchasers of such a product. These buyers, by reason of their occupation would be more competent to judge the quality of what they bought. It would not be so easy to perpetrate frauds and deceptions upon them in respect to paste paints, as it would be to inflict like frauds upon the general public in their purchase of mixed paints.

The bill does not disclose what paints besides the mixed paints are sold by complainants in North Dakota. The only other one mentioned in the bill as being manufactured and sold by them is the paste paint. The record shows T. L. Blood & Co. (who were original complainants in the case but who were dismissed immediately after the filing of the bill) produced sixty-six and two-thirds per cent. of mixed and thirty-three and one-half per cent. of paste paint. The percentages of product of complainants, unaccounted for,

probably represent their approximate output of paste paint. If this be true, complainants occupy the unique position of denouncing a law because it prevents the perpetration of fraud and deception in only one of the two forms in which they produce paint. The law takes hold of their business only so far as mixed paint is produced. It leaves to complainants full opportunity, if they wish to embrace it, to commit frauds and deceptions upon the public, in the matter of their output of paste paints. If the law in fact discriminates against their product of mixed paint, they may recoup all losses thus suffered by turning to account their immunity from regulation as to their paste products. It is truly a novel ground for a litigant to advance in an effort to overthrow an otherwise constitutional law. A failure to deal with this subject in all its aspects and phases does not, under the authorities, render the law obnoxious to the constitution.

It is enough if the law has some tendency to accomplish the desired end.

Powell vs. Penna., 127 U. S. 678.

"It has never been intimated that all possible forms of mercantile fraud must be dealt with, or none; it has always been characteristic of English legislation to proceed tentatively, step by step, and many important reforms could have been accomplished in no other way."

Freund Police Power, p. 755.

But it is far from clear that the act does not in fact include paste as well as mixed paint. It might be said the title is too restricted to accomplish that result, but that would be an objection which would affect the validity of the statute

only under certain constitutional provisions of the State. It is sufficient to say such an objection was not mentioned in the bill nor considered by the court.

The language of both Sections 1 and 2 is clearly broad enough to include the paste product. The words in Section 1 are, "Any White Lead, paint or compound;" those employed in Section 2 are, "Any mixed paint or compound intended for use as such."

Paste paint is a "compound," for in the language of the bill it means a "compound in paste form containing the necessary elements to make it a paint ready for use, except that it requires the addition of thinning material to give it the consistency necessary to make it ready for application to the surface intended to be covered." Bill paragraph 15 .

The state officers of North Dakota charged with the administration of the law interpret it as covering paste as well as mixed paint. Labels are required upon all products, both paste and mixed, containing other than the statutory pigments.

Special Bulletin, No. 6, page 12, Government Agricultural Experiment Station, Agricultural College, Fargo, N. D., issued April, 1907.

Fourth. *The act in question is well calculated to prevent the perpetration of fraud. It enables intending purchasers to know what they are buying. It prevents dishonest manufacturers from palming off upon the public cheaper substances for more expensive ones. It puts every substance used as an ingredient upon its own distinctive merits or lack of them, and prevents the inferior article from being sold for what it is not.* The class "B" pigments are the substitutes most

extensively used for, and which by their inherent character lend themselves most readily to, the adulteration of mixed paints. The record abundantly substantiates the foregoing statements:

Dr. Dudley (147, 152); Lane (316, 319); Prof. Ladd (47, 48, 75-105, 382-388, 397).

The police power of the state embraces its whole system of internal regulation and is as broad and plenary in its effect as the taxing power itself. It embraces all regulations designed to promote the public convenience or the general prosperity as well as those intended to promote the public health or the public morals or the public safety.

Cooley's Const. Lim. Page 829 (7th Ed.)
Kidd vs. Pearson, 128 U. S., 1;
R. R. vs. People, 200 U. S., 561;
Crossman vs. Lurman, 171 N. Y., 329;
Schollenberger vs. Pa., 171 U. S., 1;
Lawton vs. Steele, 152 U. S., 133.

This court has repeatedly held that the police power will be upheld for the prevention of fraud or deception upon the public and to promote fair dealings.

Scollenberger vs. Penna., supra;
Plumley vs. Mass., 155 U. S., 461.
In Plumley vs. Mass., supra, this court said:

"In none of the above cases is there to be a suggestion or intimation that the Constitution of the United States took from the States the power of preventing deception and fraud in the sale, within their respective limitations, of articles in whatever state manufactured, or that that instrument secured to anyone the privilege of committing a wrong against society."

Many statutes having a similar purpose have been upheld.

Patasco Guano Co. vs. N. C., 171 U. S., 345.

In this case this court sustained a statute regulating the sale of fertilizers, providing for their inspection and the attachment of tags.

In 1889, the Legislature of Minnesota passed an act, Chapter 7, General Laws of Minnesota 1889, which required a label to be put upon boxes and cans of baking powder which contained alum in any form so as to show that fact; the act did not require such labeling in respect of baking powder in which alum was not used as an ingredient. The Supreme Court of Minnesota, in passing upon the statute, held that it did not deprive the owner of his property without due process of law nor deny to him the equal protection of the laws.

The Court said:

"The statute does not prohibit the manufacture or sale of baking powders containing alum, but requires the fact when alum is a constituent of it to be disclosed in the manner specified. We have no doubt that it is within the power of the Legislature to impose this requirement. We need not enter upon a consideration of the

question as to whether the use of alum found in such quantities as might be included in a baking powder is or is not injurious to health. The validity of that part of the law which we are considering does not depend upon the fact of its being injurious."

The Court then explains the reasons for sustaining the law, in brief as follows: That the use of baking powder compounds has become common; that being a compound the people should know the contents, that they may judge of their quality before purchase; that people are less easily imposed upon when the contents are thus made known.

The opinion then continues:

"The owner of such property may be legally required, as a matter of proper police regulation, for the benefit of the people in general, to sell for what it actually is and upon its own merits, and is not entitled as a matter of constitutional right to the benefit of any additional market value which he may secure by concealing its true character.

Stolz vs. Thompson, 44 Minn., 271; 46 N. W., 410.

The Supreme Court of New York, in People vs. Webster, 17 N. Y. Misc. 410, declared constitutional a penal statute of that state which limited the use of the word "Sterling," "to compounds having .925 per cent. of pure silver."

A prohibition against the sale of any article as lard "which contains any ingredient but the pure fat of healthy swine" unless labeled "Com-

pound Lard" with the name and proportion of the ingredients, does not violate the 14th Amendment.

State vs. Snow, 81 Iowa, 642; 47 N. W., 777;
State vs. Aslesen, 50 Minn., 5; 52 N. W., 220;
State vs. Hanson, 84 Minn., 42; 86 N. W., 768.

See also:

Capital City Drug Co. vs. Ohio 183 U. S., 238.

Fifth. *The law does not classify complainants as manufacturers at all; it classifies only their products and the products of all alike, permitting the sale of one kind without a label and requiring labels as to all others. The Bill does not allege and the record does not show that complainants, in the manufacture of mixed paint, confine themselves to the use of substituted pigments.*

On the contrary, the evidence affirmatively discloses that at least one of them, the Devoe & Raynolds Co., manufactures a mixed paint in which only the statutory pigments are employed (518). The best and most expensive brand of mixed white paint put out by complaint, Patton Paint Company, contains no class "A" pigments.

It is fair assumption that all of complainants do likewise; that they manufacture paints, both those requiring, and those which do not require, a label under the North Dakota statute, and that they were so conducting their business prior to the enactment of such law. Such was the case with at least two of them. The operation of the statute was suspended by the court's restraining

order until after all the evidence was given. Every intendment is favorable to the constitutionality of the law. This court, in M., K. & T. Ry. Co. vs. May, 194 U. S., 267, had under consideration a statute of Texas subjecting to punishment railroad companies which allowed certain foul weeds to grow upon their right of way, and did not impose similar penalties upon any other class of land owners. The Court, among other things, said:

"When a state Legislature has declared that in its opinion policy requires a certain measure, its action should not be disturbed by the courts under the Fourteenth Amendment, unless they can see clearly that there is no fair reason for the law that would not require with equal force its extension to others whom it leaves untouched.

Approaching the question in this way we feel unable to say that the law before us might not have been justified by local conditions. It would have been more obviously just to extend the regulation at least to highways. But it may have been found for all that we know that the seed of Johnson grass is dropped from the cars in such quantities as to cause special trouble. It may be that the neglected strips occupied by railroads afford a ground where noxious weeds especially flourish, and that whereas self-interest leads the owners of farms to keep down pests, the railroad companies have done nothing in a matter which concerns their neighbors only. Other reasons may be imagined. Great constitutional provisions must be administered with caution. Some play must be allowed for the joints of the machine and it must be remembered that Legislatures are the ultimate guardians of the liberties and welfare of the people in quite as great a degree as the courts."

Three assumptions, unsupported by any evidence in the record, were thus indulged in order to support and uphold the constitutionality of the Texas statute, namely: The possibility that foul seed were dropped from the cars in such quanti-

ties as to cause trouble; that foul weeds might especially flourish upon the right of way of railroads; and that self-interest might not appeal to the railroads as to owners of farms to keep down such pests.

R. R. vs. Matthews, 174 U. S., 96.

"Every possible presumption," Chief Justice Waite said, in Sinking Fund cases, 99 U. S. 700, 718, "Is in favor of the validity of a statute and this continues until the contrary is shown beyond a rational doubt."

In view of these decisions it is an allowable assumption, and in view of the record the assumption rises to a certainty, that some, and to a strong probability that all, the complainants are producing and selling in North Dakota, and were so doing when the statute was passed, not only mixed paints containing other than the statutory pigments, but also preparations in which the latter were the sole pigments. There is indeed proof that about one-half of the leading paint manufacturers of the United States reject the class "A" and "B" pigments, clinging to their prejudice in favor of carbonate of lead and oxide of zinc (Prof. Toch, 219-223), but there is no proof that the other half limit themselves to the use alone of the substituted pigments. They do indeed use the latter as alleged in the bill, but they do not assert that they do not also employ the former as well. The proof shows that at least one of them uses statutory pigments alone and that another one in the preparation of its best white paints rejects entirely the class "A" pigments.

If the foregoing be conceded to be true, the classification of the statute is unassailable from

any point of view. It comprehends in its scope and operation every manufacturer of mixed paint. It says as to those products of paint factories wherein lead and zinc alone are used no label is required; as to all other products a label must be attached showing the ingredients employed.

The situation presented is not one where there are two distinct groups subjected to statutory classification, one of such groups making mixed paints alone from lead and zinc and the other employing other pigments either alone or in combination with lead and zinc. Upon the contrary it is a case of one group or class producing both kinds or all kinds of mixed paints. Thus the statute makes no classification of manufacturers, but deals alone with the various products coming from the same factory. This it may rightfully do under all the authorities, for it extends equal protection of the law to all. All are put into a single class and upon a basis of absolute equality.

Appellant contends the failure of the statute to specify the maximum and minimum precentages of carbonate of lead and oxide of zinc which may be employed, exposes the paint manufactured therefrom to the possibility of adulteration arising from the use of too great a proportion of zinc; zinc being cheaper than lead. But there is no concensus of opinion as to the relative proportions which are adapted to secure the best results.

Mr. Lane says the best effect, in his opinion, is produced by combining these two pigments in

about equal proportions; but he allows a latitude of 60 per cent. of either pigment in connection with 40 per cent of the other (261). Prof. Ladd stated the proper proportion was two-thirds of carbonate of lead and one-third of oxide of zinc, but he explained much depended upon where the paint was to be used, whether for outside or inside work. If for the latter he did not think the use of oxide of zinc in excess of 50 per cent would add too much hardness (423, 424). Mr. Joystad testified the proper proportions depended upon the climate of the country where the paint was to be used; that for North Dakota the percentages should be 50 per cent. of each (549, 550).

Mr. Cook thought the best results would be obtained upon outside work if not more than 50 per cent. of oxide of zinc was used (603, 604).

But as it is conceded a larger percentage of zinc can be used upon inside than on outside work, it would have been obviously impracticable for the legislature to definitely fix either the maximum or minimum proportions of either pigment to be used in order that the paint thus prepared should not be labeled.

The argument seems to be because under the statute a manufacturer might use too great a proportion of oxide of zinc, it being cheaper than carbonate of lead, therefore the statute discriminates in favor of lead and zinc; the paint made therewith, notwithstanding it contains too great a proportion of oxide of zinc, may nevertheless be sold unlabeled; while labeling is required as to all other pigments when used in mixed paint.

It is perhaps sufficient to say no such an evil is shown to have existed in North Dakota. It does not appear that oxide of zinc has been used to an undue excess or as an adulterant. On the contrary it appears that it was class "B" pigments which were extensively found in the mixed paints offered for sale, and they were the ones found to be generally employed as adulterants

(388). Oxide of zinc was not found to be thus used (396).

In any event oxide of zinc is a very much more expensive pigment than any of those named in class "B". If used to excess in combination with carbonate of lead, the product would still cost the manufacturer much more than if a like percentage of class "B" pigments were similarly employed. Thus it is apparent the statute greatly diminishes, if it does not entirely destroy, the opportunity to adulterate mixed paints. The margin of difference between the cost of carbonate of lead and the cost of oxide of zinc, is too small to furnish an incentive to a manufacturer to use the latter in too great a proportion.

But the difference between the cost of either carbonate of lead or oxide of zinc, and the cost of class "B" pigments is very great, and hence it has been found that it is the latter which are most generally employed for purposes of adulteration.

Moreover, all we have said under our fifth proposition is equally applicable here; complainants, as manufacturers of mixed paint in which only the statutory pigments are used, have equal opportunities with all others, if such opportunity there be, to cheat the public if they so desire by employing too large a percentage of oxide of zinc and too small a percentage of carbonate of lead in their unlabeled product.

The decided cases cited by appellants are in point only as to the general principles which they enunciate. None of them construe statutes similar to the one under consideration. We shall in this brief attempt no examination of the cases decided by this court and relied upon by the appellants as supporting their contentions. The facts upon which such cases are based are familiar to the court.

The case of People vs. Hawkins (157 N. Y. 1) involved the validity of a statute which required all prison-made goods to be so labeled. Hawkins was convicted of selling in New York a scrub brush made by convict labor in Ohio. It bore no label such as was required by the New York statute. The Court of Appeals held even if the Constitution of New York did not forbid the sale, the statute would yet be in conflict with the *Commerce Clause* of the Federal Constitution. The decision proceeded upon no other ground. As already pointed out, complainants do not claim in the case at bar any invasion of their rights under that clause of the Constitution.

In State vs. Julow (129 Mo. 163) the statute held to be unconstitutional forbade employers to prohibit employes from joining labor unions, or, if members thereof, to compel them to withdraw their membership. In State vs. Ashbrook (154 Mo. 375) the legislation assailed and held to be repugnant to the Constitution was an act which attempted, under the guise of police regulation, to burden department stores employing more than fifteen clerks with the payment of an annual license fee of from $300.00 to $500.00 in addition to all regular taxes. In Bailey vs. People (190 Ill. 28) the Supreme Court of that state held invalid an act which restricted the number of people a lodging house keeper might permit to sleep in one room, the act having no application, however, to inns, hotels and boarding houses.

Luman vs. Hitchins Bros. Co. (90 Md. 14) held unconstitutional a statute of Maryland

which prohibited railroads, mining corporations, their officers and agents, doing business in a certain county of that state, from engaging in general mercantile business in such county.

The briefest consideration of these cases shows they passed upon statutes bearing no resemblance to the paint law of North Dakota. We submit the decree of the lower court should be affirmed.

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HEATH & MILLIGAN MANUFACTURING COMPANY *v.* WORST.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE DISTRICT OF NORTH DAKOTA.

No. 41. Argued November 7, 8, 1907.—Decided December 9, 1907.

It is within the power of the State to prevent the adulteration of articles and to provide for the publication of their composition.

Legislation which regulates business may well make distinctions depend upon the degrees of evil without being arbitrary, unreasonable, or in conflict with the equal protection provisions of the Fourteenth Amendment to the Federal Constitution. See *Ozan Lumber Co.* v. *Union County Bank*, *ante*, p. 251.

This court will not limit the power of the State by declaring that because the judgment exercised by the legislature is unwise it amounts to a denial of the equal protection of the laws or deprivation of property or liberty without due process of law.

The statute of North Dakota requiring the manufacturers and vendors of mixed paints to label the ingredients composing them is not unconstitutional as depriving such manufacturers of their property or liberty without due process of law or as denying them the equal protection of the law because the requirements of the statute may not apply to paste paints.

THIS is a direct appeal from the Circuit Court for the District of North Dakota, sustaining the constitutionality of a statute of that State, requiring the manufacturers of mixed paints to label the ingredients composing them.

The statute is as follows:

"An Act to prevent the adulteration of and deception in the sale of white lead and mixed paints.

"*Be it enacted by the Legislative Assembly of the State of North Dakota:* 1. Every person, firm or corporation who manufactures for sale or exposes for sale, or sells, within this State any white lead, paint or compound intended for use as such, shall label

the same in clear and distinct open gothic letters upon a white background and show the true per cent of each mineral constituent contained in said paint, or if other than linseed oil is used in its preparation, the names of such oils or substitutes shall be shown together with the percentage thereof, and every person, firm or corporation who manufactures for sale, or exposes for sale or sells within this State any mixed paint or compound intended for use as such, which contains any ingredient other than pure linseed oil, pure carbonate of lead, oxide of zinc, turpentine, Japan dryer and pure colors, shall be deemed guilty of a misdemeanor and upon conviction thereof shall, for each offense, be punished by a fine of not less than twenty-five and not more than one hundred dollars and costs, or by imprisonment in the county jail not exceeding sixty days; provided, that any such person, firm or corporation who shall manufacture for sale or expose for sale, or sell within this State any white lead, paint or mixed paint containing ingredients other than those as above enumerated, shall not be deemed guilty of a violation of this act in case the same be properly labeled showing the quantity or amount of each and every ingredient used therein and not specified above, and the name and residence of the manufacturer or person for whom it is manufactured."

It is made the duty of the appellee in his official capacity to enforce the statute. A few days before the statute took effect (January 1, 1906) the appellants filed a bill to restrain its enforcement, and prayed a preliminary as well as a permanent injunction. A preliminary injunction was granted. It was dissolved on final hearing, and a decree was entered dismissing the bill for want of equity.

The grounds of attack upon the statute are that it offends against the Fourteenth Amendment of the Constitution of the United States, in that it deprives appellants of their property and liberty without due process of law, and denies them the equal protection of the laws. How it is contended the statute produces these effects will be pointed out hereafter.

The stress of the case is upon paragraph 17 of the bill and the special paragraphs "A" and "B". To these paragraphs an answer was filed. The legal effect of the others was submitted upon demurrer. Upon the issue of fact formed by the answer to paragraph 17 and the special paragraphs, testimony was taken, and upon it and the demurrer to the other allegations, and the affidavit of one Professor Ladd, the case was submitted.

The bill is voluminous. It alleges that the plaintiffs are manufacturers of mixed paints and sell their respective products in North Dakota, and that each "had established an enviable reputation for its goods;" that each sold in North Dakota mixed paints containing ingredients other than those specified in the statute, which is set out. It is alleged that mixed paint has an absolutely defined meaning in the trade, and means a paint so thinned, "by admixture of the proper liquid vehicles, as to reduce it to a consistency which makes it ready for use." The term "mixed paint," it is alleged, is used in contradistinction to "a paste paint," which paint has also a well defined meaning, meaning a paint ready for use, except that it requires thinning material to give it the necessary consistency. White lead, it is alleged, is a commercial, not a scientific term, and is commonly understood to be a dry powder consisting of commercial carbonate of lead. When ground in oil to a paste consistency it is commonly called in the trade white lead in oil, colloquially referred to frequently as "white lead." In the statute these terms are used interchangeably, and are intended to denote white lead in oil, as above defined. That various compounds containing no carbonate of lead or other ingredients in addition to carbonate of lead are frequently sold in the market labeled as "white lead." And that the words "any white lead paint, or compound intended for use as such," in the act "are intended to denote a paste paint, intended as a substitute for white lead and labelled or sold as 'white lead' or 'white lead in oil,' but which does not contain any carbonate of lead or contains other ingredients in addition thereto."

Paragraph 17 is as follows:

"Your orators further show unto your honors that the manufacture of paint, and more particularly of mixed paint, involves many practical problems, the proper solution of which demands the application of a variety of scientific principles and is the result of a great variety of practical tests and experiments; that the means, methods and processes employed in said manufacture have changed materially in the course of years to conform to the discovery of new scientific facts and the results of practical experiments; that the technology of paint manufacturing has made gradual and constant progress during the last fifty years, during which time it has undergone an evolutionary process which is still far from completed; that until about twenty-five years ago carbonate of lead was the only material which was universally conceded by manufacturers and users of paint to be a proper pigment to be used in paints requiring or admitting of the use of a white pigment; that since said time, and within the last twenty-five years, oxide of zinc gradually gained recognition among manufacturers and users of paint as being equally appropriate for the purposes for which theretofore carbonate of lead had alone been recognized as appropriate, and has come to be universally conceded as possessing important useful qualities as a white pigment not possessed by carbonate of lead; that within the last fifteen years practical experiments and tests, made with a view to widening the range of white pigments properly usable in the manufacture of paint, have demonstrated the following facts, which are now conceded by the most advanced and most successful paint manufacturers of the world, viz:

"*a*. That there are materials other than carbonate of lead and oxide of zinc which in some cases may be used in connection therewith and in other cases may be used instead thereof, and which, either without carbonate of lead or oxide of zinc, or in connection with one or both of these, according to circumstances, are as efficient as, and in some respects more efficient than, carbonate of lead or oxide of zinc, or a combination of

the two for the purposes for which the latter are used in paint; that among said materials are (*a*) sublimed lead (which is an artificial product consisting of sulphate of lead and oxy-sulphate of lead), (*b*) standard zinc lead white (which is commonly called zinc lead and is an artificial product made by the United States Smelting Company and sold in large quantities, and consists of a combination of sulphate of lead and oxide of zinc united by a furnace process), (*c*) zinc made from Western ores, which carries in its natural composition varying proportions of sulphate of lead and oxide of zinc, and (*d*) an artificial opaque white pigment, consisting essentially of zinc sulphide, zinc oxide and barium sulphate, which is known to the paint manufacturing trade under various trade names, such as lithopone, ponolith, lithophone, charlton white, becton white and Orr's white.

"*b*. That there are certain white pigments other than carbonate of lead and oxide of zinc which constitute proper and useful ingredients of paints, and which, if so used in connection with carbonate of lead or oxide of zinc, or a combination of the same, or in connection with one or more of said other materials described in the last preceding paragraph as proper substitutes for carbonate of lead and oxide of zinc, furnish to the paint wherein used important useful qualities not possessed by either carbonate of lead or oxide of zinc, or any of said substitutes therefor; that among said other pigments are sulphate of barium, silica, silicate of magnesia, calcium carbonate, hydrated sulphate of lime, and others; that the proportionate amount of the pigments last named which may properly and usefully be made an ingredient of paint, and whether any of them may be properly used as such ingredient depends upon a great variety of conditions and circumstances, but all of said pigments may, under proper conditions, serve a highly useful purpose and where properly used do essentially increase the durability and density of the paint."

It is further alleged that the statute in condemning inferentially the use of the materials mentioned in paragraph 17, and

its sub-paragraphs, "as ingredients of mixed paint and branding them as adulterants, ignores the fact that all said substances constitute proper, useful and necessary ingredients of paint, is based upon antiquated, obsolete and quite generally discarded prejudices regarding the ingredients proper, useful and necessary to be used in paint, and is therefore unreasonable and void."

That complainants and most of the successful paint manufacturers of the United States have for many years maintained and continue to maintain, in connection with their factories, chemical laboratories, wherein are able, accomplished chemical experts, who are constantly conducting experiments in the qualities and properties of new ingredients to produce the best results regarding the purposes of paint, the materials upon which it is used and the various conditions to which it may be exposed. And that the business success of such manufacturers largely depends upon the efficiency of said laboratories and experiments, "and their readiness and ability to conform their methods of manufacturing to the truths discovered by said investigations and tests." That such experiments have led to the adoption of improved methods of manufacture and the use of a widening range of ingredients and a constantly increasing degree of efficiency in the paint produced, and if continued "is sure to bring about a still higher and gradually increasing degree of merit and efficiency in the paint of the future."

Other allegations of the bill set forth the virtues and usefulness of varnish as a vehicle or thinning material of mixed paint in connection with or in place of one or other of the ingredients of the statute for some purposes and situations, and that the statute by excluding it brands it as an adulterant, and is hence void. The bill also charges the statute with inaccuracy in its designation of pure carbonate of lead as one of the ingredients of mixed paint specified, and alleges that it cannot be used for the purpose of manufacturing paint, and that the carbonate of lead, which is commonly used and has been used from time immemorial, even in paints of the higher grade, contains

approximately twenty to thirty per cent of other ingredients. It is hence charged that the statute, by specifying "pure" carbonate of lead, and prohibiting as a crime the use of commercial carbonate of lead, "without specifying on a label quantity or amount of each of its ingredients is unreasonable and void." The bill also attacks with much detail the term "pure colors" in the enumeration of the ingredients by the statute, alleges that such term neither has a definite meaning among the manufacturers of such coloring material nor among manufacturers of paint, nor is it capable of an exact or even an approximately exact definition; that there is no line of demarkation between pure and impure colors; that while some dry colors are regarded as "pure" and others "impure" by some manufacturers, there is nothing approaching a consensus of opinion upon the subject, and no rational classification has been attempted; that the standard universally applied to dry colors is not purity but efficiency; that, with the exception of a very few dry colors of limited use in mixed paints, even the very highest and most expensive grades made or imported contain large and widely varying percentages of elements which have no coloring properties. Illustrations are given, and the bill charges "that said act, in specifying 'pure colors' among the ingredients of mixed paint, and making the use of any but 'pure colors' as such ingredient a crime, unless the manufacturer or dealer stigmatizes the paint by a label as required in said act, is so uncertain and unreasonable as to be void."

It is also alleged that the only purposes for which paint is used is to preserve and beautify, and that that paint is most efficient which accomplishes those purposes for the longest time, and that any ingredient which tends to such ends is a proper ingredient; that there is no natural standard of the purity of paint, nor a widely accepted standard; that any enumeration of allowable ingredients, short of an exhaustive enumeration of ingredients, which may under particular circumstances and conditions give to paint a useful quality, is necessarily unjust and unreasonable, and even such enumera-

tion, though just to-day, by discoveries may be unjust to-morrow; that to produce an efficient paint not the ingredients alone must be considered, but the manner and the proportion of every combination and the purpose and conditions of the use of the paint; that it is, therefore, impossible to speak of a standard of purity as applied to paint, "nor is it reasonable for any statute to attempt to set up a standard of efficiency of paint by an enumeration of allowable ingredients, the only test of the efficiency of paint being its ability to serve the purposes for which it is intended."

It is further alleged that the requirement of the statute "is intended and calculated to create in the minds of the mixed paint dealers and consumers in the State of North Dakota the erroneous belief that all ingredients of mixed paint other than those specified in said act are adulterants used for the purpose of cheapening the product, and add no quality of usefulness or efficiency to the mixed paint wherein they are used; that said act in requiring mixed paint containing any ingredients other than those specified in said act as aforesaid, to be labelled as aforesaid, is a requirement that the manufacturer of and dealer in such paint shall brand the same in such a way as to hold it up to the suspicion and prejudice of the users of mixed paint, and thereby make the sale thereof in said State, if not impossible, at least more difficult and expensive."

That the excluded ingredients (they are enumerated in the bill) will have no tendency by their use to render "mixed paint by those applying the same harmful to health in any sense or degree." That while such act was intended as a police regulation for the prevention of fraud, its provisions are such that it has no tendency to accomplish such end; that the act, by failing to specify the maximum and minimum of the proportionate amount of the ingredients specified, permits the manufacture and sale of mixed paint containing those ingredients in such proportions as to make it absolutely inefficient and useless and a fraud upon the purchaser; that by holding up to the prejudice of dealers in and users of other mixed paint has the ten-

dency, in many instances, to give inferior brands a preference over superior brands of mixed paint. And that such act has no tendency to accomplish the prevention of fraud, because it does not prevent the manufacture and sale "of any imaginable paint concoction in paste form," or impure linseed oil, or any spurious article, as "white lead," or "white lead in oil," or as "white lead paint," because a paint ready for use may be lawfully made of such concoctions and substitutes; "that the manufacture and sale of paste paint is a substantial part of the paint manufacturing and selling business of the United States; that millions of dollars worth of white lead in oil and compounds intended as substitutes therefor are annually manufactured and sold in the United States; that tinting colors for use as an ingredient of paint are manufactured in large quantities and sold in cans, in paste form, throughout the United States; that linseed oil, as such, is an article of commerce throughout the United States;" and that the statute, by failing to place restriction on the manufacture or sale of such paint and material, but imposing penalties and restrictions on the manufacturers of mixed paint, unjustly discriminates against the latter, and, for the same reason and "the other facts and circumstances" stated in the bill, they will be deprived of their property without due process of law.

It was also alleged that each of the complainants manufactures "scores of different kinds and shades of mixed paints, differing from each other in chemical composition; that even the same kind and shade of mixed paint manufactured by any one of your orators has no fixed chemical composition, but varies in such composition from time to time and practically with each lot manufactured, by reason of the wide variations in the chemical composition of the constituent ingredients, more especially the chemical composition of the dry colors used; that in order to properly label the cans of mixed paint manufactured by your orators and sold in North Dakota showing 'the quantity or amount of each and every ingredient used therein, and not specified' in said act, each of your orators

would have to have a chemical analysis made of each lot of mixed paint before putting the same up in cans or other containers." It is alleged that this would add materially to the cost of manufacture of mixed paints, cast a burden upon them, from which the manufacturers of other paints are free, and would deprive them of their property without due process of law.

It is further alleged that there are dealers in North Dakota who have on hand stock of mixed paint subject to the act and who will be subject to criminal prosecution unless the cans containing the same be opened and analyzed and labelled, which opening would make the paint unsalable; that dealers who in the future shall purchase from any of the complainants, and the distributing agents and salesmen of complainants, will be subject to criminal prosecution, that thereby a multiplicity of criminal prosecutions will ensue and suits to enforce payments for paints sold or to be sold. And if the complainants should label the mixed paints manufactured by them as required by the act they would not only be subject to the expense thereof, but that their products will be held up to suspicion and prejudice of the dealers in and users of the same, which will make it either impossible or more difficult and expensive to sell their products in said State, all of which will produce incalculable and irreparable injury to complainants; that the dealers in paints who are now subject or may be subject to prosecution under such act will not have sufficient interest to or can successfully raise the defense of the invalidity of the act, "inasmuch as such defense involves the consideration of the complex state of facts hereinbefore set forth."

Fear is expressed that most of such prosecutions will result in conviction, and that by such the brands of mixed paints involved therein will be branded as adulterated and illegal products, and will thereby be rendered unsalable, all of which will produce incalculable and irreparable injury to complainants, and will constitute the taking of their property without due process of law and the denial to them of the equal protection of the laws.

It is difficult to separate the admissions and denials of the answer to paragraph 17. It admits that practical problems are involved in the manufacture of paints, particularly of mixed paints, the solution of which is the result of a variety of practical tests and experiments; "that the technology of paint manufacture has made gradual and constant progress during the past fifty years, during which time it has undergone an evolutionary process." It admits that formerly carbonate of lead was the only material which was universally used as the proper pigment used in paints requiring or admitting of the use of a white pigment, and that oxide of zinc has gained recognition as in many cases appropriate as a white pigment, but denies that such recognition has come within the last twenty-five years; on the contrary, asserts it has been recognized and used for a period of thirty years. Admits that there are materials other than carbonate of lead and oxide of zinc used in connection with the latter or instead of them, but denies their equal efficiency; on the contrary, alleges that tests and experiments have not determined or demonstrated the value and usefulness of such materials, and further alleges that their use and value have not progressed beyond the experimental stage. That about one-half of the leading manufacturers entirely reject them, or reject them because upon test they have proved to be unsatisfactory and inefficient, and others that time has not yet demonstrated their value. Admits that zinc made from Western ores is valuable and efficient as a pigment, provided sulphate of lead incidental to its production does not exceed in quantity 5 per cent of its constituent elements, and alleges that the percentages of the sulphate of lead are widely different.

The answer to sub-paragraph "b" of paragraph 17 admits that in making the colored paints there mentioned it is necessary to employ some of the articles mentioned in connection with some pigment other than carbonate of lead, and that the latter would change or modify the exact shades sought to be produced. But it is alleged on information and belief that the aggregate of all mixed paints produced, sold and consumed in

North Dakota, in the preparation of which it is necessary to exclude carbonate of lead and to include one or more of the substituted materials mentioned in the bill, does not exceed 25 per cent of the aggregate of all mixed paints which may be prepared and produced by the use alone of carbonate of lead and oxide of zinc as pigments. Save as to those admitted, the answer denies the efficiency of the materials mentioned, and avers that the general use of them is "to cheapen and adulterate the paints wherein they are employed," and of all substances known they are best adapted and lend themselves most readily and are commonly used as adulterants to cheapen mixed paints. It is further averred that 70 to 75 per cent of the paints used in the State are mixed paints, and that their adulteration has become and is a great evil. "That no other substances have been discovered or known, which, by their inherent qualities, lend themselves so readily to or are so commonly employed for such purpose of fraud and deception as those described in said sub-paragraph 'b.'"

Mr. Sigmund Zeisler, with whom *Mr. Henry L. Stern* was on the brief, for appellants:

Corporations are persons within the provisions of the Fourteenth Amendment. *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S. 150, 154.

The classification, though ostensibly between paints, is in reality between paint manufacturers. *Connolly* v. *Union Sewer Pipe Co.*, 184 U. S. 540.

The exercise of the police power must be reasonable. The question of the reasonableness of a state statute ostensibly passed in the exercise of the police power is a judicial question. *Mugler* v. *Kansas*, 123 U. S. 623, 661; *Lake Shore & M. S. R. Co.* v. *Ohio*, 173 U. S. 285, 301; *Wisconsin, M. & P. R. Co.* v. *Jacobson*, 179 U. S. 287, 301; *Dobbins* v. *Los Angeles*, 195 U. S. 223, 235; *Lawton* v. *Steele*, 152 U. S. 133, 137; *Holden* v. *Hardy*, 169 U. S. 366, 395; *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S. 150; *Lochner* v. *New York*, 198 U. S. 45; *Chicago, B. & Q.*

R. Co. v. *Illinois*, 200 U. S. 561, 592; *Lake Shore & M. S. R. Co.* v. *Smith*, 173 U. S. 684; *Long* v. *Maryland*, 74 Maryland, 565.

While every intendment is to be made in favor of the lawfulness of the exercise of this power, the courts will not imagine the existence of some undisclosed and unknown reason for its exercise. The simple decision of the legislature cannot be held to constitute such reason. *Lake Shore & M. S. R. Co.* v. *Smith*, 173 U. S. 684, 699; *Dobbins* v. *Los Angeles*, 195 U. S. 223, 237; *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S. 150, 154; *Lochner* v. *New York*, 198 U. S. 45, 56.

A statute ostensibly passed in the exercise of the police power must be judged by its natural effect and not by its proclaimed purpose.

A statute which restrains the liberty or property rights of individuals, though ostensibly passed in the exercise of the police power, cannot be held valid, unless it has a real or substantial relation to some legitimate object of the police power which its provisions reasonably tend to accomplish. *Lochner* v. *New York*, 198 U. S. 45, 64; *Mugler* v. *Kansas*, 123 U. S. 623, 661; *C., B. & Q. R. Co.* v. *Illinois*, 200 U. S. 561, 593; *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S. 150.

Even if a statute is fairly referable to the police power of the State, still if it impairs or destroys a right secured by the Federal Constitution, it is invalid. *Connolly* v. *Union Sewer Pipe Co.*, 184 U. S. 540, 558.

In making regulations, providing penalties or imposing liabilities in the exercise of the police power, the legislature has the right to make classifications. But classification must have some reasonable basis. The differences which will support class legislation must be such as in the nature of things furnish a reason for separate laws. The differences must bear a reasonable relation to the purpose of the statute. Arbitrary designation or selection is not classification. When burdens are placed upon some and not upon others similarly situated with respect to the purpose for which such burdens are imposed, the classi-

fication is arbitrary and illegal. Cases *supra* and *Soon Hing* v. *Crowley*, 113 U. S. 703, 709; *Barbier* v. *Connolly*, 113 U. S. 27; *Cotting* v. *Kansas City St. Yds. Co.*, 183 U. S. 79; *Luman* v. *Hitchins Bros. Co.*, 90 Maryland, 14; *Missouri* v. *Ashbrook*, 154 Missouri, 375; *State* v. *Julow*, 129 Missouri, 163; *Bailey* v. *The People*, 190 Illinois, 28.

The liberty guaranteed by the Fourteenth Amendment embraces the right of the citizen to be free in the enjoyment of all his faculties; to be free to use them in all lawful ways. *Allgeyer* v. *Louisiana*, 165 U. S. 578.

To enjoy the privilege of pursuing an ordinary calling or trade upon terms of equality with all others in similar circumstances, is an essential part of the rights of liberty and property as guaranteed by the Fourteenth Amendment. *Powell* v. *Pennsylvania*, 127 U. S. 678, 684; *People* v. *Hawkins*, 157 N. Y. 1; *Bailey* v. *People*, 190 Illinois, 28, 35.

Any law which, without a valid reason, annihilates the value of property, restricts its use or takes away any of its essential attributes by imposing onerous conditions upon the right to hold or sell it, deprives its owner of property without due process of law. To require a label upon some mixed paints while exempting others, is not only to burden them with peculiar expense, but also to require them to bear a badge of inferiority which diminishes their value and impairs their selling qualities. *People* v. *Hawkins*, 157 N. Y. 1.

To restrict one's freedom of competition upon equal terms with others in the same business is prohibition. *Brimmer* v. *Rebmann*, 138 U. S. 78.

The Fourteenth Amendment forbids that any impediment be interposed by a state statute to the pursuits of any one except as applied to the same pursuits by others standing in the same relation to the purpose of the statute. *Barbier* v. *Connolly*, 113 U. S. 27; *Soon Hing* v. *Crowley*, 113 U. S. 703; *Connolly* v. *Union Sewer Pipe Co.*, 184 U. S. 540; *Gulf, C. & S. F. R. Co.* v. *Ellis*, 165 U. S. 150; *Cotting* v. *Kansas City St. Yds. Co.*, 183 U. S. 79.

Mr. John S. Watson, with whom *Mr. T. F. McCue*, Attorney General of the State of North Dakota, was on the brief, for appellee:

Assuming that the act sets up a standard of purity or efficiency and puts the paint containing substituted pigments at a disadvantage by requiring a label, it is yet constitutional, because the classification is warranted by the situation disclosed in the record.

The act, the validity of which is drawn in question, in fact makes no discrimination for or against complainants. It establishes no standard of purity or efficiency. It deals with carbonate of lead and oxide of zinc, with which all are familiar, by saying that all persons, firms and corporations employing them as pigments in the preparation of mixed paints may do so without labeling the product.

If the act does not include paste paint (which we do not admit) such omission goes only to the completeness of the law, to its failure to deal with the whole subject. It does not render it unconstitutional. Complainants may, like all others, sell unlabeled paste paint of whatever ingredients composed.

It is enough if the law has some tendency to accomplish the desired end. *Powell* v. *Pennsylvania*, 127 U. S. 678.

The act in question is well calculated to prevent the perpetration of fraud. It enables intending purchasers to know what they are buying. It prevents dishonest manufacturers from palming off upon the public cheaper substances for more expensive ones. It puts every substance used as an ingredient upon its own distinctive merits or lack of them, and prevents the inferior article from being sold for what it is not. The class "B" pigments are the substitutes most extensively used for, and which by their inherent character lend themselves most readily to, the adulteration of mixed paints. The record abundantly substantiates the foregoing statements.

The police power of the State embraces its whole system of internal regulation and is as broad and plenary in its effect as the taxing power itself. It embraces all regulations designed

to promote the public convenience or the general prosperity as well as those intended to promote the public health or the public morals or the public safety. Cooley's Const. Lim., p. 829 (7th ed.); *Kidd* v. *Pearson*, 128 U. S. 1; *R. R.* v. *People*, 200 U. S. 561; *Crossman* v. *Lurman*, 171 N. Y. 329; *Schollenberger* v. *Pennsylvania*, 171 U. S. 1; *Lawton* v. *Steele*, 152 U. S. 133.

The police power will be upheld for the prevention of fraud or deception upon the public and to promote fair dealings. *Schollenberger* v. *Pennsylvania, supra; Plumley* v. *Massachusetts*, 155 U. S. 461; *State* v. *Snow*, 81 Iowa, 642; *State* v. *Aslesen*, 50 Minnesota, 5; *State* v. *Hanson*, 84 Minnesota, 42. See also *Capital City Drug Co.* v. *Ohio*, 183 U. S. 238.

Mr. Justice McKenna, after making the foregoing statement of the case, delivered the opinion of the court.

It appears from the evidence that the statute which is assailed by appellants was one, among others, passed to prevent the adulteration of articles or to provide for the publication of their composition. That both purposes are within the competency of the State can hardly be denied. A discrimination is, however, asserted to have been made in the exercise of the power, with the following results: (1) The imposition of the burden of analyzing and labelling the ingredients of mixed paints, from which burden the manufacturers of paste paint and manufacturers of mixed paints containing only the ingredient specified in the act are to be free. (2) Holding up to the prejudice of dealers in and users of mixed paints containing ingredients other than those specified, branding them as suspicious or adulterated, and rendering them unsalable or less salable than mixed paints containing the statutory ingredients, though more efficient than the latter for certain purposes. We can see that expense will be cast on the manufacturers of mixed paint not containing ingredients enumerated in the statute, but that such paint will be branded as adulterated is not easy to accept, and seems to be opposed by other allegations in the

bill. It is averred that the complainants have a yearly increasing trade in the State of North Dakota which has attained to many thousands of dollars per annum, and that by the high quality of their goods and by advertising they have attained an enviable reputation for them. How the firmness and profit of that trade, how the excellence and degree of that reputation, can be affected by revealing the composition of the goods, is not by us discernible. Manufacturers who use inferior materials because they are so or from a mistaken opinion of their quality, though they have statutory sanction, would be more affected than complainants. Consumers of paint, we may assume, like the consumers of other kinds of goods, seek excellence in them, and where excellence is demonstrated by use will care little of what pigments it is composed. This, however, is anticipating somewhat, and we will pass to the statute, consider its purpose and see whether its classification is justified by that purpose.

We will omit from citation the cases in which this court has passed upon the power of the States to classify objects for the purpose of government. A review of them is not necessary in this case. Counsel have collected and analyzed them, applied or rejected them as they have thought they supported or opposed their respective contentions. We have declared many times, and illustrated the declaration, that classification must have relation to the purpose of the legislature. But logical appropriateness of the inclusion or exclusion of objects or persons is not required. A classification may not be merely arbitrary, but necessarily there must be great freedom of discretion, even though it result in "ill-advised, unequal and oppressive legislation." *Mobile Co.* v. *Kimball*, 102 U. S. 691. And this necessarily on account of the complex problems which are presented to government. Evils must be met as they arise and according to the manner in which they arise. The right remedy may not always be apparent. Any interference, indeed, may be asserted to be evil, may result in evil. At any rate, exact wisdom and nice adaptation of remedies are not required by

the Fourteenth Amendment, nor the crudeness nor the impolicy nor even the injustice of state laws redressed by it.

Keeping these principles in mind, let us examine the North Dakota statute. Its purpose, as expressed in the title, is "to prevent the adulteration of and deception in the sale of white lead and mixed paints." It attempts to accomplish this purpose by the following requirements: (1) All white lead and compounds intended for use as a substitute therefor must be labelled to clearly show the per cent of each mineral therein. (2) All mixed paints must show their true composition, unless made of pure linseed oil, carbonate of lead or oxide of zinc, turpentine, Japan dryer and pure colors. (3) All substitutes for linseed oil in the preparation of paints must be clearly shown on the label.

The second and third divisions we are concerned with in this case, and it is insisted their requirements work a discrimination between mixed paints which contain and those which do not contain any ingredients other than those specified. It will be observed that the manufacture for sale and the selling of the first kind is made a misdemeanor unless the paint be labelled as required by the statute. The manufacture or sale of the other kind is free from such consequence or condition. It is also charged that the statute discriminates between mixed paints and paste paints, it being asserted that the latter, no matter what their ingredients, need not be labelled. To this charge we may immediately answer that it is open to contest whether the act exempts paste paint from its requirements, and the executive officers of the State have construed it as not exempting them. But be this as it may, there is a distinction between the paints, and the evils to which the statute was addressed may not exist or be as flagrant in one as in the other. There, indeed, may be a degree of competition between them, but other circumstances and conditions may have directed the legislative discretion. This record certainly does not present any data to make it certain that the discretion was arbitrarily exercised. Legislation which regulates business

may well make distinctions depend upon the degrees of evil without being arbitrary or unreasonable. *Ozan Lumber Co.* v. *Union County National Bank et al., ante,* page 251.

2. The argument which attacks the discrimination between mixed paints is an elaboration of paragraph 17 of the bill. It is able, circumstantial and variously illustrated. It has been given careful consideration, but it would extend this opinion too much to answer it in detail or review its specifications. It is ultimately grounded on the contention that the pigments enumerated in the statute, and hence denominated statutory pigments, are not more efficient—maybe not as efficient to the manufacture of paint, either in themselves or as depending upon the particular use to which paint may be put, the proportion of ingredients varying with such use, or even with the fancy or taste of the user, or the atmospheric conditions to which paint may be exposed, as the pigments mentioned in sub-paragraphs "A" and "B" of paragraph 17, and hence called class "A" and class "B" pigments. And, it is contended, that there is "neither a standard of purity nor a general or widely accepted standard of purity," and that the statute, by making a standard of some ingredients and excluding others "useful, efficient, harmless and in some cases most essential," is an arbitrary discrimination and an improper exercise of the police power of the State, not justified by the comparative newness of the excluded ingredients, or because they are not used by unprogressive manufacturers, or used by unscrupulous ones in excessive proportions to cheapen their products. And this, it is urged, is all that is established against such ingredients. Besides, it is further urged, the charge that they are used to cheapen paint is true of one of the statutory ingredients.

The claims for class "A" and "B" pigments are controverted, and if they are sustained at all are sustained upon the balancing of and the judgment between the testimony of experts, certain publications and exhibits. But a problem of a different kind was presented to the legislature of North Dakota. It was not what scientific men might find out by chemical and laboratory

tests, or progressive men might discover by practical experiments, but what the people of the State could find out or be justified in accepting as established. It was the experience of the people, not the acts of some progressive manufacturers, which directed the legislation, and it was to protect the people, when following the opinions formed from that experience, from deception, that the statute was enacted. It may be that the purpose could have been accomplished better in some other way. It may be that it would have been more entirely adequate, let us say, even more entirely just, to have required that all paint should be labelled, the statute nevertheless cannot be brought under the condemnation of the Fourteenth Amendment. Legislatures, as we have seen, have the constitutional power to make unwise classifications. But we may be going too far in concession to the argument of appellants. The legislature of North Dakota may have met the evils which exist as best it could, and there is a strong presumption that it did. At any rate, a fair question was presented, whether to take as a standard the ingredients that years of use had demonstrated as excellent or make regulation universal. We think it would be limiting the power of the State too much to say that a judgment exercised under such circumstances must be condemned as denying the equal protection of the laws or that the liberty assured by the Constitution of the United States in the Fourteenth Amendment gives a right to either progressive or conservative tendencies in legislation.

Appellants not only attack the standard adopted by the statute, but attack the use made of it. They assert that the standard is of "purely negative character," in that it fails to "require all allowable ingredients essential for efficiency to be used and its failure to prescribe maximum and minimum percentages," and, therefore, it is insisted, "permits of the manufacture and sale under the special sanction of the law of that which is inefficient, useless and a fraud upon the purchaser." It is besides asserted that the statute enumerates among the allowable ingredients a material which cannot be used, to wit,

pure carbonate of lead, and it is asked whether a statute having these effects can be a valid exercise of the police power of the State. The answer is ready enough. The enumeration of "pure carbonate of lead" may be corrected into commercial carbonate by a perfectly allowable exercise of construction; and as to the other charge, the inefficiency of the statutory ingredients on account of the failure to define the proportions in which they must be used, goes to the defect or incompleteness of the legislation, not to its legality. Were the proportions ever so exactly defined, the relation of mixed paints to the resultant product or its liberty of sale or power of competition would not be lessened.

There is a special and earnest criticism of the provision of the statute requiring varnish when used as a thinning material to be specified, and a like criticism of the term "pure colors" to designate one of the statutory ingredients. "The exclusion of varnish," it is said, "from the list of allowable ingredients is indefensible and undefended." The bill alleges, and it is not denied, that there is very large demand for certain mixed paints, which are enumerated, that are capable of producing a high gloss for decorative purposes and have high resisting power to moisture, and that varnish is the "only thinning material now known which may appropriately be used as an ingredient of mixed paint to produce said effects." "Notwithstanding these admitted facts," counsel's comment is, "varnish is branded as an adulterant by the statute."

The term "pure colors," it is alleged, is intended to refer to coloring material used by paint manufacturers in powdered form, and is known in the trade as "dry colors;" that the term "pure colors" neither has a definite meaning nor is "it capable of an exact or even approximately exact definition;" that some dry colors are regarded as "pure" and others "impure" by individual manufacturers, but there is "nothing approaching a consensus of opinion," and "no rational classification on the subject has ever been attempted." The standard "applied to dry colors is not purity but efficiency."

We regard these criticisms answered by our general discussion, and we have specially noticed them that it may not be thought we have overlooked them. They may emphasize what we have already said as to the possible imperfection of the classification of the statute. It must not be forgotten, however, that inaccuracies of definition may be removed in the administration of the law. And it must be borne in mind that the use of the non-enumerated ingredients is not forbidden nor the advantages of the practical tests and scientific research made by appellants taken away from them. The sole prohibition of the statute is that those ingredients shall not be used without a specific declaration that they are used—a burden maybe, but irremediable by the courts—maybe, inevitable, in legislation directed against the adulteration of articles or to secure a true representation of their character or composition.

Decree affirmed.